The RUBBER AGE

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Vol. 21 JULY 25, 1927 No. 8

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50 East 42nd Street, New York

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RUBBER SERVICE A16 LABORATORIES CO.

SUPREME for MOLDED TUBES

SCORCHY ULTRA-ACCELERATORS ARE NOT NEEDED FOR MOLDED TUBES
A-16 GIVES 5 MINUTE CURES

The formula given was mixed and calendered 4 ply .060" gauge. Tubes were cured in a 4.40 Kuhlke tube mold for periods of from 3 to 7 minutes. The time given was the closed period of the mold. Tests on the cured stocks (pulls made parallel to calender grain) cut from the finished tubes are as follows:

Formula	lbs.	oz.
Smoked Sheets	66	7
Zinc Oxide	3	
Blanc Fixe	27	
Stearic Acid		8
Sulfur	2	5
A-16		12
	100	- 0

Cure at 60 lbs.	Load at 500%	Tensile	Elongation
3 minutes	974	3200	730%
4 "	1196	3745	740
5 "	1223	4010	735
6 "	1380	4125	725
7 "	1405	3835	700

Additional strips were aged in the Bierer-Davis oxygen bomb under 300 pounds oxygen pressure at 70°C for 36 hours (equivalent to 4 years natural aging) and on subsequent testing showed:

Cure at 60 lbs.	Bomb Aging	Load at 500%	Tensile	Elongation	% Loss in Tensile
3 minutes	36 hrs. / 70° / 300 lbs.	1050	3155	730%	1.4
4 "	"	1227	3440	710	8.2
5 "	"	1230	3785	730	5.6
6 "	"	1403	3760	710	8.8
7 "	"	1513	3695	680	3.7

Note the wonderful range of cure of this stock. Since the proper cure, as shown by the data above, is slightly less than 5 minutes, this stock will give a 5 minute cycle, or 12 tubes per hour per mold. The oxygen bomb test indicates the aging life of this tube to be excellent, as would be expected of A-16 stocks, and no anti-oxidant is therefore needed.

Further details on the use of A-16 and other materials in molded tube work may be had on request.

The RUBBER SERVICE LABORATORIES CO.

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Akron, Ohio

Manufacturing Plant
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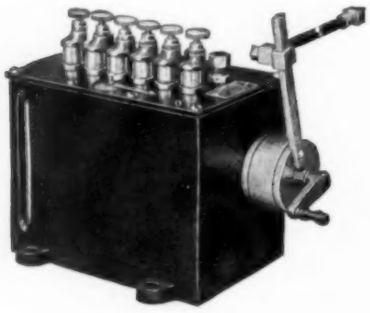
Model T lubricator is supplied for sizes from one to twenty-eight feeds —more if needed. Either ratchet or worm-gear drive can be supplied. Each lubricator is tested against a 2000-pound pressure. This makes Model T particularly applicable for installation on mill journals, where pressures are invariably high.



There are several descriptive circulars that tell about Bowser's complete line of lubricators, as well as all about Model T.

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The RUBBER AGE

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Why More Uniform ?

versus

An Analytical Comparison

Aerfloted Arrow Black

1. All Huber burning houses are set on solid concrete foundations permitting rigid and tight construction and elimination of cross-drafts.

2. All Huber burning houses are equipped with a double set of adjustable ventilators spaced at precise intervals to give accurate draft control under varying atmospheric conditions.

3. The Huber burning house has a flat roof, giving a rectangular cross section which aids in the elimination of eddy currents of air within the house, and simplifies uniform drafting.

4. Each individual Huber burning house is fed its exact proportion of gas through an orifice controlled by individual mercury manometers. Hourly readings are taken to exact proportionate feed.

5. Burning conditions in Huber houses are maintained scientifically uniform regardless of atmospheric conditions by control of carbon dioxide content of exit gases,—recorded continuously and automatically.

6. The Huber process of air-flotation utilizes a cushion of air, travelling 5500 feet per minute, to assist the passage of carbon black through 100 mesh screen. Extraneous particles are ejected by centrifugal force.

Ordinary Grades

1. The ordinary burning house is erected on bare ground, supported by uprights embedded in the ground.

2. The ordinary burning house is drafted by means of plugging up or opening holes cut in the sheet metal sides and top.

3. The ordinary burning house has the conventional peaked roof, tending towards eddy currents under the peak, and preventing control of the important overhanging "smoke blanket".

4. The ordinary plant has only one master flow-meter, feeding a number of burning houses. The amount fed to the individual house can only be determined by estimation of the flame size.

5. Ordinary burning houses are re-drafted only at such intervals as general seasonal changes occur.

6. The ordinary "pan" bolter forces carbon black through a screen by erosive brush action, tending to grind up extraneous matter, forcing it likewise into the finished product.

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1790 BROADWAY
NEW YORK CITY, N. Y.

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The
RUBBER AGE
The Only Twice-a-Month Rubber Publication

Vol. 21 NEW YORK, JULY 25, 1927 No. 8

STOCKHOLDERS ADOPT GOODYEAR REFINANCING

Approve $60,000,000 Bond Issue and Redemption of all Debenture Bonds and Creation of New Preferred Stock—New Directors Elected.

All details incident to the final adoption of the recapitalization plan of the Goodyear Tire & Rubber Co., announced at the conclusion of litigation a month ago, were adopted by stockholders at the second session of the annual meeting held in Akron on July 11 and 12. At the first session, held July 11, stockholders ratified the issue of $60,000,000 first mortgage 5% bonds, sold after the existing litigation against the company was cleared up, by Dillon, Read & Co., and elected a new board of seventeen directors, which in turn elected an executive committee of seven members. President P. W. Litchfield was reelected for a term of three years by the executive committee.

At the second session, held July 12, stockholders authorized the creation of a new preferred stock issue of 1,000,000 shares, which issue will make it possible for the company to fund accumulated dividends on the present preferred. At the conclusion of the second session, the company issued a call for the redemption of all outstanding debenture bonds, with only one dissenting vote. The proceeds derived from the sale of the $60,000,000 5% bonds will enable the company to retire its outstanding 8% first mortgage bonds and debentures, 8% prior preference stock and its management shares, all of which were issued in connection with the reorganization of 1921.

The newly elected board of directors consists of the following membership: P. W. Litchfield, president of the Goodyear Tire & Rubber Co., Clarence Dillon, president of Dillon, Read & Co., John Sherwin, chairman of the board, Union Trust Co., Grayson M. P. Murphy, of Grayson M. P. Murphy Co., Elton Hoyt, 2nd, of Picklands, Mather & Co., E. B. Greene, chairman of the Cleveland Trust Co., board, Robert C. Schaffer, president of A. G. Becker & Co., Walter B. Mahony, publisher, G. A. Tomlinson, Cleveland Steamship Company, Samuel L. Smith, vice-president and sales manager, National Malleable Steel and Castings Co., Fayette Brown, president of Stewart Furnace Co., J. A. House, president Guardian Trust Co., George B. Durell, president American Fork and Hoe Co., Dr. Robert H. Bishop, Jr., Henry B. Manton, president of Robinson Clay Products Co., Russell L. Robinson, vice-president, Robinson Clay Products Co., and Francis Seiberling. The seven members of the newly elected executive committee are: E. B. Greene, G. A. Tomlinson, S. L. Smith, John Sherwin, P. W. Litchfield, Francis Seiberling and W. B. Mahony. More than 70% of all classes of stockholders were represented at the annual meeting, either in person or by proxy.

AUTO OUTPUT LESS

Automobile production in the United States in the first six months of 1927 was 178,037 vehicles less than in the first half of 1926. It has been known that the automotive industry was going at a slower pace than was the case last year but these figures, which are released by the Bureau of the Census, are the first to show the exact extent of the change. The figures are: First six months of 1927, 1,779,334 passenger cars; 248,506 trucks; and 2,027,840 total. First six months of 1926, 2,070,418 passenger cars, 235,459 trucks; and 2,305,877 total. During the entire year 1926 there were 4,219,442 cars and trucks produced in the United States and 205,115 in Canada. Many observers believe that the total production of the two countries this year will approximate 4,000,000 vehicles.

Ajax Abandons Display

The Ajax Rubber Co., has abandoned its display rooms located at 218 West 57th St., New York City, and transferred its executive offices to the upper floors of the same building. This move is in line with the company's announcement a month ago that certain changes would be made to reduce overhead costs.

SEES BETTER FUTURE FOR RUBBER INDUSTRY

President of Fisk Rubber Believes Second Half of 1927 Will Place Leading Firms In a Position to Show Normal Earning Power—Fisk Outlook Good.

Harry T. Dunn, president of the Fisk Rubber Co., who sailed recently for Europe on the Leviathan, stated on departing that there had been a marked improvement in the outlook for a majority of the rubber and tire manufacturing companies and that the first six months of this year had seen a turn for the better in the industry.

"Operating conditions in the tire industry during the first six months of 1927, despite some surface unsettlements, have been satisfactory," Mr. Dunn is quoted as saying. "These conditions will not be completely reflected in earnings for the period, however, due to lower raw material prices and consequent low selling prices during the last half of 1926 and the first half of 1927. These adjustments will tend to obscure the real earning power of some of the companies during the period. The industry has been enjoying a record volume of business during the first half of the year and conditions are steadily becoming more stable.

"The Fisk company has placed itself in a strong financial position. Our dollar sales volume has run considerably ahead of the early months of 1926, although prices received for our products are somewhat lower than last year. The unit sales show an even more striking gain.

"I believe the prices for tires as well as rubber, cotton and raw materials have at last reached a stable basis and that the rubber industry, which in the past two and one half years has been both prince and pauper, is now in a position to show the earning power to which it is entitled by reason of its importance among the country's great industries. Our own outlook is satisfactory and I anticipate a sharp increase of earnings of the Fisk company during the last six months of this year."

JUNE RUBBER IMPORTS DECLINE 3,000 TONS

June Imports Total 33,194 Tons Which Is a Decline From May But Greater Than Corresponding Period Last Year—Consumption Totals 33,801.

Imports of crude rubber into the United States during June, according to the Rubber Association totaled 33,194 tons, or 3,375 tons less than May imports which amounted to 36,569 tons. Compared, however, to imports in the corresponding period a year ago, June arrivals were greater by over 3,000 tons. For the six months ended with June the total is 226,850 tons, the largest amount landed at American ports within recent years and a substantial increase over the same period last year, when crude rubber arrivals reached 208,637 tons.

Plantation rubber imports during June amounted to 31,444 tons as compared to 33,735 tons in May, while Para, African, Central and Guayule arrivals similarly declined from May. Waste rubber from various sources totaled 230 tons in June as against 1,056 tons in May. Arrivals of miscellaneous gums were 1,092 tons as against 1,075 in May. The following table affords a comparative analysis of crude rubber imports in the six months of 1926 and 1927:

	1926	*1927*
Plantations	194,977	212,108
Paras	7,075	9,973
Africans	1,961	1,359
Centrals	2,433	1,634
Guayule	2,168	1,762
Manicoba and) Matto Grosso)	26	14
TOTAL	208,637	226,850

According to estimates of the Rubber Association, consumption of crude rubber in the United States based on 100%, amounted to 33,801 long tons during June, as compared with 34,600 long tons in May. Consumption, therefore, was greater than imports, which was not the case in May, when imports were in excess of consumption. Preliminary estimates by the Department of Commerce relative to June imports of crude rubber are more conservative, the department estimating that imports totaled 29,547 tons, or almost 4,000 tons less than the Rubber Association figure.

Stocks of crude rubber on hand June 30, based on 100%, amounted to 94,209 long tons, the largest tonnage on hand in recent years. This compares with 94,563 long tons on hand at the end of May, and 92,757 long tons on hand at the end of April. Stocks afloat on June 30 based on 100%, totaled 47,233 long tons as compared with 44,181 long tons at the end of May.

Favors Philippine Rubber

Major-General Leonard Wood, governor of the Philippine Islands, who recently paid a visit to President Coolidge in South Dakota, has expressed himself in favor of rubber growing in the Philippines. Interviewed by newspaper reporters in regard to conditions in the Islands, General Wood particularly stressed the possibilities of rubber growing, declaring that the Philippines were capable of producing sufficient rubber to supply the demands of the United States. Rubber trees, according to General Wood, grow rapidly in the Islands and produce a good grade of rubber. He favors the granting of leases on rubber lands up to 50,000 acres for a 25-year period, with renewal privileges to provide for a continuous operation of 75 years.

OVERLAND TRAIL NAMES NEW FACTORY MANAGER

The Overland Trail Rubber Co., of Omaha, Neb., announces through its president Frank J. Grace, the appointment of H. H. Evans as factory manager in charge of production. Mr. Evans, who for the past several years has been in charge of production for the Corduroy Tire Co., of Grand Rapids, Mich., is a man of recognized standing in the rubber industry, his twenty-two years of total service having included important assignments in the manufacturing departments of the Goodyear, Goodrich and Miller organizations.

President Frank J. Grace reports a heavily increasing demand for Pioneer Cord tires which are manufactured by the Overland Trail company, and a steadily widening distribution through jobbing and dealer outlets.

U. S. RUBBER SHOWING BUSINESS IMPROVEMENT

Business of the U. S. Rubber Co., in the second quarter of 1927 showed some improvement over that of the preceding three months and, it is believed, results for the second quarter about covered fixed charges. First quarter business, according to estimates, resulted in a deficit of nearly $3,000,000, but the company was reported to have broken even in April and May. Results in June were probably a shade better, so that the half year's deficit was probably slightly less than that shown at the end of the first quarter.

In the first half of 1926 the company reported net earnings of $4,915,688 after interest and depreciation, equivalent to $2.85 a share on $81,000,000 common stock after preferred dividend requirements for the period.

At a recent meeting of the directors of the U. S. Rubber Co., a quarterly dividend of 2% was declared on the first preferred stock, payable August 15. At the same meeting Middleton S. Burrill, a director, resigned.

London 6-Wheel Busses

The London General Omnibus Company is now introducing six-wheeled pneumatic tired buses carrying 68 passengers to replace the old type bus which carried only 34. Solid tires were used on the old models.

MAY CASING AND TUBE INVENTORIES ADVANCE

Rubber Association Figures for May Reveal Decrease In All Production and Shipments of Casings and Tubes and Steady Increase In Inventories.

Statistics released by the Rubber Association of America relative to poduction, shipments and inventories of pneumatic casings and inner tubes for the month of May, reveal that both production and shipments are showing a steadily downward movement, while inventories, on the other hand, are steadily increasing. Production of pneumatic casings during May totaled 6,151,926 units, based on 100%, which compares with 6,299,667 in April. Tire shipments totaled 5,657,437 units, based on 100%, as compared with 5,701,952 in April. Inventories of casings at the end of May accordingly advanced to 12,462,108 as compared with 12,122,382 units in April, and 11,583,000 units in March.

Inner tube production in May, based on 100%, totaled 6,737,357 units which compares with 7,373,248 units in April. Shipments of tubes based on 100% totaled 6,140,369 units in May as compared to 6,359,180 in April. Inventories, on the other hand, increased from 17,801,874 units in April to 18,389,994 units in May. Production and shipments of balloon tires and tubes show a similar decline, but with substantial increases in inventory.

While statistics relative to the production of casings reveal a decline from April, it must be borne in mind that April production was record breaking, and the May figure, while not as high as that of April, is nevertheless a high production record. This is not the case with inner tube production which has been exceeded both in 1926 and 1925. Shipments of both tires and tubes have also been greater both in 1925 and 1926.

April and May figures of the Rubber Association, raised to 100%, follow:

	May, 1927	April, 1927
PNEUMATIC CASINGS		
Inventory	12,462,108	12,122,383
Production	6,181,926	6,299,667
Shipments	5,657,437	5,701,952
INNER TUBES		
Inventory	18,389,994	17,801,874
Production	6,737,357	7,373,248
Shipments	6,140,369	6,359,180

Voluntary Restriction in D. E. I.

The Rubber Growers' Association of London has announced that companies representing 88¼ per cent of the total rubber acreage controlled by British companies operating in the Dutch East Indies have agreed to adjust their production according to the British rubber restriction scheme during the current year although it is not compulsory to them.

Goodrich Official Sails

Bertram G. Work, chairman of the board of directors of the B. F. Goodrich Co., sailed for Europe July 16 on the S.S. "Majestic".

STOCKHOLDERS OF OLD BOSTON BELTING MEET

Stockholders of the Boston Belting Co., one of the oldest rubber companies in the United States, but no longer operating, met recently in Boston at the offices of the Boson Safe Deposit & Trust Co. The attendance was so large that the meeting was adjourned to the Chamber of Commerce building, with George F. Willett, president of the company, presiding.

Mr. Willett stated that there was no treasurer's report but that the balance sheet as of December 31, 1926, showed total assets amounting to $1,000, consisting of cash and stock in the United States Worsted Co. Liabilities, he said, were about $210,000, among which was a debt to a Boston bank of $4,500 for interest, $750 for taxes, $5,000 for accounting expenses, $60,000 in notes payable, and $139,000 due to George F. Willett. "It is obvious," Mr. Willett said, "that the corporation is unable to meet its obligations and there is no equity for stockholders."

Quincy Tucker stated at the meeting that he understood Mr. Willett had tried in every way to interest certain rubber concerns to purchase the plant and business of the Boston Belting Co., but without success. He said that he thought the company's name might have some value and suggested that the stockholders authorize sale of the name to him for $1, with provision that in the event he can dispose of it to some active rubber concern, he would turn over to the stockholders 75% of the proceeds.

Motion was made to authorize the officers to file voluntary petition in bankruptcy, but this was voted down upon suggestion of Mr. Willett. Nominating committee of three was selected to choose the stockholders' protective committee, with full power. The protective committee nominated comprises F. F. Collier, Raymond Merrill, W. S. Beatty, C. J. Upham and Edward Burbeck.

PRODUCTION OF CYCLES CONTINUES TO DECLINE

The steady decline in the market for cycle tires for original equipment is well shown in the Census report of the operations of the motorcycle and bicycle industries, which has just been finally released. In 1925 there were 39,350 motorcycles manufactured in the United States, as compared to 41,898 in 1923 and 59,122 in 1919. The production in 1921 was low, in keeping with most other industries which slowed down in that year. The value of the 1925 production of motorcycles was $8,875,657. Most of these machines are exported.

The 1925 production of bicycles amounted to 303,446 vehicles, as compared with 486,177 in 1923 and 470,675 in 1919. The bicycles were valued at $7,030,566. Massachusetts is the leading State in manufacture of cycles.

DE PALMA VISITS SEIBERLING AGAIN

When Ralph De Palma first began to test the durability of automobiles by racing them over the fastest and most difficult courses in the world, Frank A. Seiberling furnished him with his first set of tires. Recently, when De Palma called upon Seiberling at Akron, they were joined by John F. Palmer, father of modern tire designing, now associated with the research department of the Seiberling Rubber Co. The above photograph shows, left to right, Seiberling, Palmer and De Palma.

One Auto for 66 Persons

At the beginning of 1927 there was in circulation throughout the world one automobile for every 66 inhabitants, according to a computation of I. H. Taylor of the Department of Commerce. In the United States there are enough automobiles to transport the entire population at one time but, as the figure just quoted shows, a comparable condition does not yet exist abroad.

Over 95 per cent of the automobiles in the world are American-made, Mr. Taylor says. About 97 per cent of the world's passenger automobiles were American but foreign manufacturers had a larger share of the business in trucks and busses.

The United States, United Kingdom, France and Canada, representing less than 11 per cent of the world's population, had almost 90 per cent of the automobiles.

SWINEHART TIRE MAN ACCEPTS CITY OFFICE

G. D. Sullivan, for seven years purchasing agent for the Swinehart Tire & Rubber Co., of Akron, has accepted the appointment of purchasing agent for the city of Akron and will assume his new duties about August 1. In addition to having been purchasing agent for the Swinehart company, Mr. Sullivan has acted in this capacity with the Kelly-Springfield Tire Co., and with the Firestone Tire & Rubber Co., prior to his association with the Swinehart Tire & Rubber Co. Mr. Sullivan has been a resident of Akron since 1901. He is a director in the National Purchasing Agents organization.

GOODYEAR AERO CHIEF WANTS BIGGER AIRPORT

In anticipation of receiving the contract from the U. S. Navy for building a giant dirigible, the design for which was recently accepted by the government, W. C. Young, manager of the aeronautical department of the Goodyear Tire & Rubber Co., of Akron, will go before the Akron city council with a request for an appropriation of $400,000 for purchasing and improving the present temporary airport of that city. In the event that the Goodyear-Zeppelin Corporation receives the contract to build the proposed giant dirigible, the airport facilities in Akron would have to be greatly augmented, it was pointed out. W C. Young, who is also chairman of the aviation committee of the Ohio Chamber of Commerce, visited Columbus early in July to attend a meeting of his committee in which the question of Ohio airports was considered.

Although several sites have, from time to time, been proposed for a municipal airport in Akron, selection of such a site has been delayed awaiting the confirmation that the Goodyear company would receive the Navy contract. Now, with the assurance of such a contract for Goodyear reasonably certain, the Mayor of Akron has chosen a committee to select an airport. A hangar large enough to contain the proposed new dirigible would cost upwards of a million dollars. The present hangar at the Wingfoot Lake flying field of the Goodyear company would hardly accommodate half of the "Los Angeles," to say nothing of an airship of 6,500,000 cubic feet, which will be the size of the new dirigible.

EDISON ABSORBED IN QUESTION OF RUBBER

Famous Inventor Is Said To Be Devoting Whole Time To The Problem of Greater Rubber Production and The Chance of Growing Shrubs in the United States.

Two months ago Thomas A. Edison returned to his laboratory in West Orange, N. J., from Fort Meyers, Fla., where he spent the winter experimenting with rubber plants. Following his return, Mr. Edison visited the Botanical Gardens in New York City where he examined several rubber plants and tapped some of the trees in order to obtain samples of latex. It is now reported that Mr. Edison's visits to the Botanical Gardens have become very frequent, and that the inventor is entirely engrossed in the subject of rubber, spending much of his time in the administration buildings of the Gardens, and also at the Botanical library, which is located in downtown New York.

It is said that Mr. Edison is interested in the discovery of methods which will increase the avilability of crude rubber for American manufacturers. He is entering into this field, which is new to him, with the same enthusiastic and adventurous spirit which has resulted in so many well-known inventions. In his work Mr. Edison is assisted by Barukh Jonas, who examines scientific treatises on the subject of rubber in the French, German and Russian languages, and abstracts these for Mr. Edison's study. Mr. Jonas has been associated with Mr. Edison almost constantly both at his laboratory in West Orange, N. J., and at his home in Llewellyn Park, N. J.

In order to be near the Botanical Gardens Mr. Edison ceased motoring from New Jersey to New York, and made arrangements to stay with some relatives in Searsdale, N. Y., where he is now living and visiting the Botanical library almost daily. It is said that his interest in rubber was to some extent originally aroused by Harvey Firestone, president of the Firestone Tire & Rubber Co., and a close friend of Mr. Edison. But Mr. Firestone has no direct interest in Mr. Edison's present research and experiments.

William H. Meadowcroft, secretary to Mr. Edison, stated that the inventor's research so far has extended to the point where he has obtained specimens of a considerable number of plants reputed to be capable of producing rubber, or a substitute, and has begun experiments to ascertain the amount, quality and utility of the product. Mr. Edison himself is not at present ready to discuss the conclusions he has reached or what ideas have suggested themselves to him for elaboration.

Seiberling Plans Addition

The Seiberling Rubber Co., of Toronto, Ont., which is operated by the Seiberling company in Akron, manufacturers of tires and rubber specialties, has engaged a consulting engineer of Toronto to prepare plans for a proposed addition to its plant. The addition will be one story high and will cost approximately $35,000 with equipment.

RECLAIMING CO. HALTS TUCKER RUBBER SALE

The U. S. Rubber Reclaiming Co., Inc., of New York, has petitioned the Federal court of Buffalo, N. Y., for an order impounding the money received from the proceeds of the auction of the Tucker Rubber Co., of Buffalo, which occurred June 21. Federal Judge John R. Hazel approved the sale of machinery, fixtures, raw materials and other assets of the company whose affairs are being liquidated by equity receivers for $36,567, a sum sufficient to pay creditors.

The U. S. Rubber Reclaiming Co., alleges that it owns most of the machinery and equipment included in the sale. The reclaiming company states in its application that it is the successor of the Madison Tire & Rubber Co., of New York, which leased the machinery to the Tucker company in 1923, and that the lease was renewed in 1926. Receivers for the Tucker company claim that title to machinery was vested in the Tucker company, and oppose the claim of the reclaiming company. The court will be asked to appoint a special master to hear testimony.

N. J. ZINC APPOINTS GENERAL SALES HEAD

Marshall L. Havey, for the past six years vice-president of the Celluloid Co., in charge of sales, has been appointed general sales manager for the New Jersey Zinc Co., and the New Jersey Zinc Sales Co., with offices in New York City.

Mr. Havey was born in Knoxville, Tenn., and received his early education in the University School at Knoxville, and finished at the University of Tennessee and Columbia University. Previous to his connection with the Celluloid Co., he was general sales manager for Cheney Brothers of New York, and was also connected with the advertising business.

He is a member of the American Society of Sales Executives and the New York Sales Managers' Club.

U. S. Rubber Meeting

Sales representatives of the U. S. Rubber Co., in all parts of the eastern states opened their annual mid-summer sales conference at the Hotel Statler, Buffalo, N. Y., on July 11. The conference extended through four days. Thomas J. Needham, general sales manager of the company's footwear department, was chairman of the conference. Among the officers of the company who attended the meeting was Herbert Smith, vice-president.

ESTIMATE DECREASE IN COTTON PLANTING 12%

The official cotton acreage report, as prepared by the Government, showing the area in cultivation on July 1, totals 42,683,000 acres, or 12.4% less than was in cultivation on June 25 last year. Last year's acreage, according to the Department of Agriculture, was 48,730,000. However, the average yield of 181.9 pounds per acre, which was harvested last year, was the largest since 1914-15, and was produced under exceptionally good conditions, with favorable weather and the ravages of the boll weevil almost negligible.

This year the necessity of economy owing to the unsatisfactory price at which the bulk of the last crop was marketed, together with the disorganization and loss caused by the Mississippi floods, will not encourage a satisfactory yield. It is generally believed that a production of 16,000,000 bales is most improbable and that a much smaller yield is not unlikely. Eighteen cents, which is the price at which cotton is at present selling although seeming to be a high price in comparison with that ruling six months ago, is not a high price if the world continues to absorb supplies at the same rate as during the past twelve months.

Although preliminary estimates by the Government are inclined to be low, it is believed that the greatest decrease in acreage will occur in Florida and Missouri, a decrease of 35%; in Tennessee, 19%; in Oklahoma and Louisiana, 18%, and Arizona, 17%. It is estimated that even in Arkansas the decrease in acreage is only about 15%, while in Mississippi it is only 11%.

Tire Conservation Abroad

A high degree of tire conservation throughout the world is indicated by the steadily increasing shipments of tire repair materials from the United States, according to the Rubber Division of the Department of Commerce. This business exceeded the million dollar mark for the first time in 1925 when shipments were valued at $1,103,637. In 1926, however, an increase of almost 50 per cent was shown and the business amounted to $1,612,074. In 1923 less than $400,000 worth of tire materials were exported from the United States. The conservation movement which started in 1925 is believed to be responsible in large part for the increase. Shipments are continuing heavy in 1927.

General Tire Leases

The General Tire & Rubber Co., of Akron, has leased the property at the southwest corner of West 57th Street and Eleventh Ave., New York City, for twenty-one years with option on 50 additional years. The lease dates from 1930, at which time extensive improvements for sales and services are to be made.

PARA-FLUX

(Reg. U. S. Patent Office)
(U. S. Pat. No 1,611,436)

The Universal Softener

ADAPTABLE

For Tires, Mechanicals, Frictions, Hard Rubber, Reclaims.

UNIFORM

Manufactured to Rigid Laboratory Standards.

IMPROVES

Wear, Tensile, Ageing, Softness, Tack.

ECONOMY

High Quality—Maximum Softening, Moderate Price.

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116 Central Savings & Trust Bldg.
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STEARIC ACID
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MAGNESIA

JUNE RIM INSPECTION DECREASES FROM MAY

June Total is 1,871,538 as Compared With 2,169,208 in May—Of All Rims Inspected and Approved, Balloon Rims Constitute 77%.

According to the June statement of rims inspected and approved by the Tire and Rim Association of America, the grand total of rims inspected and approved was 1,871,538 as compared to 2,169,208 rims inspected in May and 2,110,035 rims inspected in June, 1926. Rims inspected during June of the current year, therefore, show a slight falling off from May Figures. Complete statistics follow:

RIMS INSPECTED AND APPROVED

RIM SIZE	JUNE 1927 NUMBER	%	6 MOS. 1927 NUMBER	%	6 MOS. 1926 NUMBER	%
Motorcycle						
24x3	1,275	0.1	17,653	0.1	15,735	0.1
26x3	3,753	0.2	21,834	0.2	49,966	0.4
28x3	—	—	920	0.0	2,377	0.0
Total	5,028	0.3	40,407	0.3	68,078	0.5
Clinchers						
30x3-24	—	—	—	—	2,302	0.0
30x3½-23	140,829	7.5	506,769	4.4	1,784,849	14.2
31x4-23	3,117	0.2	12,945	0.1	15,609	0.1
Total	143,946	7.7	519,714	4.5	1,802,760	14.3
18" Balloon						
25x3½-18	—	—	100	0.0	722	0.0
26x4-18	84,231	4.5	495,964	4.3	—	—
27x4½-18	3,249	0.2	21,883	0.2	—	—
22x5-18	—	—	242	0.0	—	—
Total	87,480	4.7	518,189	4.5	722	0.0
19" Balloon						
26x3½-19	58,506	3.1	373,842	3.3	46,289	0.3
27x4-19	82,836	4.4	425,158	3.7	84	0.0
28x4½-19	20,595	1.1	244,534	2.2	—	—
29x5-19	453	0.0	1,640	0.0	—	—
Total	162,390	8.6	1,045,174	9.2	46,373	0.3
20" Balloon						
27x3½-20	5,545	0.3	103,143	0.9	129	0.0
28x4-20	363,058	19.4	1,529,847	13.4	1,522,369	12.2
29x4½-20	40,499	2.2	212,636	1.9	251,316	1.8
30x5-20	59,347	3.2	183,081	1.6	155,737	1.2
Total	468,449	25.1	2,028,707	17.8	1,929,551	15.2
21" Balloon						
28x3½-21	545,940	29.2	3,778,486	33.4	5,328,504	39.4
29x4-21	112,827	6.0	1,350,536	11.8	1,780,380	13.9
30x4½-21	62,279	3.3	653,847	5.7	846,723	6.2
31x5-21	5,283	0.3	97,431	0.8	258,921	1.9
33x6-21	1,582	0.1	33,182	0.3	64,675	0.5
Total	727,911	38.9	5,913,482	52.0	8,279,203	61.9
22" Balloons						
29x3½-22	—	—	146	0.0	—	—
30x4-22	149	0.0	3,645	0.0	4,801	0.0
31x4½-22	1,019	0.1	5,074	0.0	23,891	0.2
Total	1,168	0.1	8,865	0.0	28,692	0.2
High Pressure						
30x3½-23	8,057	0.4	49,674	0.4	82,983	0.6
31x4-23	2,451	0.1	4,442	0.0	10,183	0.1
32x4½-23	16,808	0.9	105,380	0.9	232,641	1.7
32x4-24	8,835	0.5	80,212	0.7	89,261	0.7
33x4½-24	546	0.0	941	0.0	596	0.0
32x3½-25	3,484	0.2	5,680	0.1	4,866	0.0
33x4-25	389	0.0	2,517	0.0	4,175	0.0
34x4½-25	503	0.0	11,519	0.1	16,456	0.1
Total	41,073	2.1	260,365	2.2	441,161	3.2
20" Truck						
30x5-20	164,247	8.8	842,976	7.4	363,598	2.8
32x6-20	38,231	2.0	123,436	1.1	115,348	0.8
34x7-20	11,396	0.6	36,140	0.3	26,217	0.2
36x8-20	1,431	0.1	9,585	0.1	5,690	0.0
40x10-20	299	0.0	921	0.0	189	0.0
Total	215,604	11.5	1,013,038	8.9	511,042	3.8
22" Truck						
36x7-22	—	—	696	0.0	1,186	0.0
Total	—	—	696	0.0	1,186	0.0
24" Truck						
34x5-24	8,470	0.5	23,912	0.2	23,212	0.2
36x6-24	5,789	0.3	23,900	0.2	46,478	0.3
38x7-24	2,470	0.1	11,114	0.1	10,592	0.1
40x8-24	1,456	0.1	6,989	0.1	5,968	0.0
44x10-24	304	0.0	304	0.0	559	0.0
Total	18,489	1.0	66,219	0.6	86,809	0.6
GRAND TOTAL	1,871,538		11,414,856		13,195,577	

A. C. S. INSTITUTE OF CHEMISTRY OPENS

The first session of the Institute of Chemistry of the American Chemical Society opened in the first week in July at State College, Pa., on the grounds of the Pennsylvania State College, for a series of conferences extending through the month. The program of the conference provides for daily courses of lectures with motion pictures in the late afternoon and discussions of some popular aspect of science in the evening. The group which gathered at State College in the first week of the session included many who came from distant points. Membership in the Institute now includes representatives of California, Porto Rico, Florida, Nova Scotia, and intermediate points.

On July 25 S. E. Sheppard of the Eastman Kodak Co., the author of an article on the electrodeposition of rubber published in THE RUBBER AGE on April 10, will be the speaker at the morning conference of the Institute. The subject will be "Determination of Particle Size". In the program of motion pictures to be shown during the conference, "The Story of Rubber" will be presented on July 28.

Among the guests at State College are J. C. Drummond of the University of London, Dr. Tropsch, of the Kaiser Wilhelm Institute of Coal Research, and Dr. Rideal of Cambridge University, England.

Raritan and Michelin Busy

Reports coming from New Brunswick, N. J., where the Raritan Rubber Co., and the Michelin Tire Co., are located, state that these two companies are enjoying increased business, the Raritan company, which manufactures solid tires exclusively, operating on a 12-hour a day schedule.

N. J. ZINC LITHOPONE INFRINGEMENT SETTLED

The suit brought by the New Jersey Zinc Co., New York, in the United States District Court for the District of Delaware, against the Krebs Pigment & Chemical Co., alleging infringement of the New Jersey company's patents for the manufacture of lithopone, has been compromised. The Krebs company agrees to become a licensee under the patents, and the New Jersy Zinc Company agrees to grant such a license.

This compromise terminates all pending litigation involving the zinc company's patents. Besides the Krebs company, the licensees under these patents include E. I. du Pont de Nemours & Co., Sherwin-Williams Co., Grasselli Chemical Co., Chemical & Pigment Co., United Color, & Pigment Co., and Eagle-Picher Lead Co.

Weights and Measures Laws

The Bureau of Standards of the Department of Commerce has just published a new compilation of weights and measures laws of all states, territories, insular possessions, and of the Federal government. The publication, which contains 976 pages and may be purchased from the Government Printing Office in Washington, D. C., for $2.30, lists the Federal laws and regulations first, followed by the laws of the states and territories presented in alphabetical order. An appendix gives the weights per bushel of various commodities, as fixed by law. The publication is designed for the use of manufacturers and shippers of package goods in interstate commerce and others interested in weights and measures laws.

Save Salmon Falls Mills

The New England Public Service Co., a subsidiary of the Middlewest Utilities, is making an effort to secure a textile concern to operate the mills of the Salmon Falls Manufacturing Co., of Salmon Falls, N. H., which the utility interests purchased for $500,000, according to reports. The mills were the sole industry of the town and were forced out of business because of the competition of other tire fabric manufacturers. It is believed that the Insull interests may secure a manufacturer to operate the mills, in which case no cotton mills in New Hampshire will be idle and none of them moved south.

Want Litchfield to Serve

It is reported that the Ohio legislative committee on aviation is seeking a number of prominent persons in the state to serve on an advisory committee to the legislative committee. Among those who will be asked to serve are Orville Wright and P. W. Litchfield, president of the Goodyear Tire & Rubber Co., Akron.

Actual Abrasion Tests Now Possible

The GRASSELLI ABRADER

[*Patent Applied For*]

AS another contribution to the development of the rubber industry the GRASSELLI ABRADER was designed to meet the recognized need of a scientific method of making accurate and true abrasion tests.

It measures "Volume Loss", simultaneously measuring "Rate of Work", thus providing calculation of "Volume Loss per Unit of Work Expended".

A RUBBER MANUFACTURER WRITES:
"The results are very interesting and they compare with actual road tests satisfactorily."

The Grasselli ABRADER does more **than simply measure the volume of rubber worn away —it gives results and comparisons nearest to those obtained in actual usage, an advanced and scientific method of testing stocks for**

TIRES — FOOTWEAR — FLOORINGS — MATS — HOSE — BELTING — INSULATION — ROLLS — SOLES — HEELS — ETC.

Complete description sent on request

The GRASSELLI CHEMICAL CO.

RUBBER SERVICE DEPT.

347 MADISON AVE., NEW YORK

USE COLORED RUBBER FOR DRESS DECORATION

Producers of rubber, faced with a considerable over production, are continually looking for new outlets. Rubber has found its way into the production of many articles hitherto made from other substances, such as tiles, floor covering, bed springs, and shoe soles to mention but a few. The latest addition is to apply rubber for decorative effects on dress materials.

The advances of recent years of the dyeing of rubber have made it possible to produce rubber articles in a variety of bright, attractive and fast shades, and consequently its application for decorating dress materials has now become feasible. The rubber is dyed in various shades and then drawn out into fine tubular filaments 9 to 12 inches long. These may be connected together to form a fringe or may be plaited or worked into floral designs such as are now very popular. At present the material is only obtainable in Paris, but English rubber manufacturers are, it is understood likely to shortly produce this interesting material. As its present selling price is about $1.25 for twenty pieces about 9 inches long it is probable that there are great profit-making possibilities for the enterprising manufacturer.

End Stock Voting Trust

Notices were published on July 15 by the Goodyear Tire & Rubber Co., of the termination of common and preferred stock voting trust agreements. The notices were addressed to holders of stock trust certificates representing common and preferred stock in the Goodyear company. The notices state that pursuant to article 4 of the voting trust agreement, dated May, 1921, the voting trustees have terminated the trust and have filed an order directing the delivery of the certificates representing common and preferred stock of the company in exchange for stock trust certificates issued under the agreement and representing such common and preferred stock. Distribution of certificates representing common and preferred stock of the company in the amounts called for by the trust certificates will be made to the registered holders of the certificates on and after July 31.

The stockholders' meeting of the Goodyear Tire & Rubber Co., which was held in Akron on July 11 and 12 was adjourned until July 28, when the meeting will be resumed. It was explained that while all business matters were taken care of in the two meetings on July 11 and 12, the meeting on July 28 would be for the purpose of adjusting any matters which might arise in the meantime.

Charles Anthony Morss

Charles Anthony Morss, former governor of the Federal Reserve Bank of Boston and vice-president of the Simplex Wire & Cable Co., died recently in his summer home in Cohasset, Mass. He was 69 years of age. Mr. Morss, who was born in Boston, began his career in the wool business and was associated with his father in the firm of Morss & White. While working with this firm, he became treasurer of the Simplex Wire & Cable Co., Boston, and later vice-president. In December, 1917, he resigned his position as treasurer. Mr. Morss is survived by his wife, three sons, a daughter and three brothers, one of whom, Everett Morss, is president of the Simplex company.

Pioneer Rubber Co. Busy

The Pioneer Rubber Company which was mentioned in the last issue of THE RUBBER AGE as having financial difficulties has no connection with the Pioneer Rubber Company of Willard, Ohio, which is now enjoying the best period of business in its ten years history. A branch plant at Attica, Ohio, is also busy. Pioneer of Willard and Attica manufactures toy balloons, sporting goods and rubber gloves. A large export trade is enjoyed in addition to national distribution in this country.

THREE MASON MEN WITH PENNSYLVANIA RUBBER

Three men who were formerly connected with the Mason Tire & Rubber Co., of Kent, O, are now connected with the Pennsylvania Rubber Co., of Jeanette, Pa., of which D. M. Mason, organizer of the Mason company, is vice-president. George C. Van Veen, for a number of years central district manager for the Mason company, and for the past three years western manager of the Pharis Tire & Rubber Co., of Newark, O., has joined the Pennsylvania company as district manager and will have his headquarters in Chicago.

Frank S. Burrell, formerly chief branch auditor of the Mason company has become chief branch auditor of the Pennsylvania company, and Ira C. Monroe, formerly superintendent at the Mason plant has charge of special development work with the Pennsylvania company.

Preparation of Rubber

The Rubber Association of America has recently cooperated with the Rubber Growers' Association of London in the testing of rubber prepared with paranitrophenol and acetic acid, preliminary experiments having indicated that paranitrophenol could be used satisfactorily. Rubber thus prepared was sent through the two organizations to five British and four American rubber manufacturers. Complaints were received from one British firm and from two American firms. These dealt principally with the slow curing properties of the rubber prepared in the new way.

Muzzall in U. S.

A. H. Muzzall, a partner in the Meyer-Muzzall Company of Manila, P. I., is on a visit to the United States. Mr Muzzall's company is interested in rubber growing and marketing in the Philippines, while he himself was the rubber expert with the Department of Commerce investigating party that visited the islands in 1924. He was formerly employed on the plantations of the Goodyear Tire and Rubber Company.

The
GENERAL
CORD
—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE & RUBBER CO.

GOODYEAR SALES HEAD PASSES 20 YEAR MARK

L. C. Rockhill, sales manager of the Goodyear Tire & Rubber Co., Akron, completed 20 years' service with the company in July. Mr. Rockhill began with the repair department, and, after 12 years in various capacities as assistant manager of the automobile tire department, as automobile tire sales and merchandise manager, he was appointed sales manager in 1919. He organized the aeronautic department and was largely responsible for the organization of the company's service station plan and sales policy.

Mr. Rockhill was admitted to the Goodyear 20-year class when he received a service pin from F. K. Espenhain, first vice-president of the company, in the presence of a number of Goodyear officials.

Donovan Withdraws

S. J. Donovan, formerly president of the Donovan Packing & Rubber Co., of Philadelphia, has withdrawn from the company, and has been succeeded by T. Brennan as president and treasurer. Mr. Brennan was formerly secretary-treasurer, and before joining the Donovan company was connected with All-bestos Corporation and the United States Asbestos Co. Mr. Donovan has established a factory in Chester, Pa., where he will manufacture steam and hydraulic packings, including all types of metal packings.

Award Rubber Patents

The U. S. Patent Office, Washington, D. C., awarded patents to four persons employed in rubber companies located in Akron. Those who received the awards are: Clayton O. North, inventor of a rubber vulcanization apparatus and process, assigned to Rubber Service Laboratories; Harold A. Denmire, bead-placing ring, assigned to General Tire & Rubber Co.; Tod J. Mell, method of making patterned rubber sheeting, assigned to B. F. Goodrich Co., and William C. Stevens, tire stripping machine and machine for wrapping tire tape, assigned to Firestone Tire & Rubber Co.

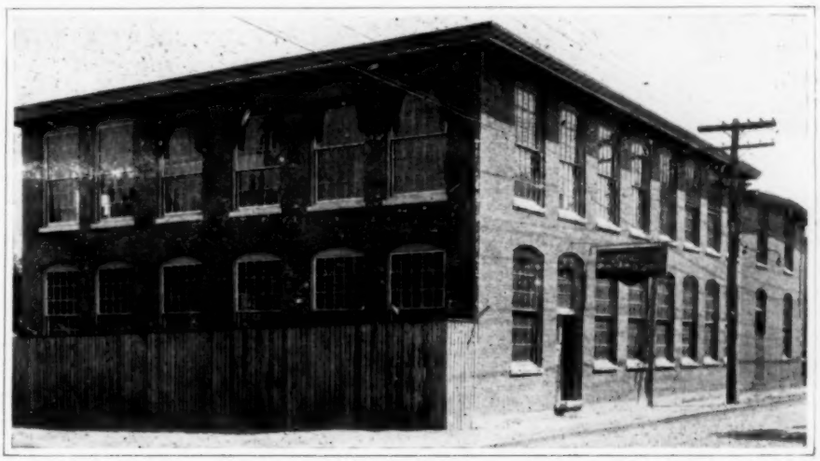
Paramount May Build

Preliminary plans for the construction of a $25,000 addition, with equipment, to the plant of the Paramount Rubber Co., of Paterson, N. J., are under way, according to reports. The Paramount company manufactures hollow rubber articles and rubber athletic goods.

Gutta Percha Names Coffey

Gutta Percha & Rubber, Ltd., of Toronto, announce that J. Herbert Coffey, Jr., who has been a member of the board of directors and factory manager of the company for several years, has been elected managing director of the company, effective July 1.

NEW ADDITION TO TESTING MACHINE FACTORY



This new building adds 10,000 square feet to the space used by the D. C. Scott Company at Providence, R. I., in the manufacture of testing machinery for the rubber and textile industries. The basement and first floor will be given over to manufacturing; the third floor will house an assembling department and the company offices.

FACTORY IN ENGLAND GOODYEAR WILL OPEN

The Goodyear Tire & Rubber Co., of Akron, has acquired a model rubber factory and 70 acres of land at Wolverhampton, England, near Birmingham, which, it is hoped, will be in operation by the end of this year. The company has acquired this plant largely for the purpose of escaping the recent duty imposed on tires by the British government. The present plant has a capacity of about 2,000 tires and tubes daily and additional equipment will be shipped from the company's Akron plant.

The whole common capital of the new English factory totals £800,000, or about $400,000,000, which has been subscribed by the parent company.

Atlanta Columbus Branch

The Columbus Tire & Rubber Co., of Columbus, O., has opened a factory branch at Atlanta, Ga., with an annual payroll of about $30,000. The branch, according to an officer of the Atlanta chamber of commerce, will be for warehousing and sales purposes, and will serve Georgia, North and South Carolina, Florida, Alabama, Mississippi, Louisiana and Tennessee.

Writes On Rubber Growing

E. S. Underhill, manager of the educational department of the U. S. Rubber Co., is the author of an article entitled "America's Part in the Production of Crude Rubber," appearing in the June issue of *Motor Travel*. Mr. Underhill's article deals principally with the history of the U. S. Rubber Co.'s plantation developments in Sumatra.

Adopts Rubber Snubbers

Durant Motors, Inc., manufacturers of Star automobiles, have adopted rubber motor cushions to eliminate motor vibration in their cars. The manufacturers of the Star four-cylinder cars claim that they are the first in the low-priced field of automobile producers to adopt rubber cushioned motor suspension. By the use of these cushions all metal to metal contact between the motor and the frame is eliminated, resulting, according to the Durant company, in a quiet and smooth motor.

Houston Rubber Plant Fire

A fire of undetermined origin recently destroyed one of the buildings in the plant of the Houston Rubber Co., of Houston, Tex., resulting in damage estimated by officials of the company to be in the neighborhood of $15,000 to $20,000. The loss, it is said, was partially covered by insurance. The structure which was burned contained several tons of old casings, bales of scrap rubber and reclaiming machinery.

Converse Wants Gold Notes

In a letter recently addressed to stockholders of the Converse Rubber Shoe Co., of Malden, Mass., president M. M. Converse asks stockholders to participate in an issue of $500,000 five year 7% gold notes. The letter also requests stockholders not to give up their stock but to hold on to it, and states that the company earned over $11,500 in April and over $10,000 in May, with the firm's production sold up to October 1. On June 1 the Converse Rubber Shoe Co., deferred payment on its 7% cumulative preferred stock.

CLAIMS BRITISH MUST TIGHTEN RESTRICTION

In the opinion of F. R. Henderson, president of the Rubber Exchange of New York, the British Colonial Office must either abandon the rubber restriction act or put the "teeth" back into it. In a review of the world crude rubber situation, made public July 18, Mr. Henderson said that strong pressure is evidently being brought to bear upon the British authorities to have the assessment of many of the large rubber estates reviewed.

"The British restriction enactment has had a very serious set-back," the survey says, "due to the surplus of unused coupons and the rather high basis for production this year. A falling market has followed the minimum export allowance of 60%. We suspect that strong pressure is being brought to bear in the Colonial Office in London to review the basis of assessment of many estates, and this may easily bring about a decided reduction in quantities which may be shipped for the balance of the year.

"If the British authorities desire a price around 21d to prevail for rubber and if the intention of the restriction act was to keep the price consequently in the neighborhood of a 40-cent level, the ways and means will be found to correct the situation now prevailing that has dictated a recent level around 17d. Under the terms of the restriction enactment revision of assessment is permissable at any time in the discretion of the controller of exports.

"The drop in the market has been thoroughly natural in view of the increasing supplies, British criticism, notwithstanding, and there is nothing in the immediate outlook to justify a reation upward. We believe that the British authorities will either put the 'teeth' back into restriction or abolish the plan entirely."

Crude Rubber Exhibition

An exhibition of the development of crude rubber from the seed to the finished commercial product was placed on public view by the Rubber Exchange of New York on July 16 at its offices at 31 South William St., New York City. This is said to be the only exhibit of its kind in the United States. The specimens, consisting of mature Hevea seeds, fruits and flowers, were sent to F. R. Henderson, president of the Exchange, by the Rubber Research Institute of Malaya. The specimens on view include latex and coagulum, as well as creped coagulum and five of the important grades traded in on the contract in use on the Rubber Exchange including prime ribbed smoked sheets and first latex and off quality crepe. Permission to view the exhibit may be obtained upon application to the secretary.

Dunlop Companies Join

It is reported from London that directors of the Dunlop Rubber Co., of Australiasia have entered into a provisional arrangement with the Dunlop Rubber Co., of England for financial association of the two companies and a close technical and commercial alliance. Arrangements involve sale to the English company of 500,000 shares at 25 shillings, with a call on an additional 500,000 shares for four years at 30 shillings; also formation of a separate New Zeland company jointly owned by the two companies.

Seiberling Sales Increase

The Seiberling Rubber Co., of Akron, reports sales for the first half of this year totaling $7,298,011, and net earnings of $826,958, after interest, depreciation, and all charges except Federal taxes. After setting aside $50,000 for contingencies and after payment of preferred dividends, $796,958 was added to surplus. In the first half of 1926 sales totaled $6,616,652, and net earnings $182,235.

Judsen Boosts Capacity

The Judsen Rubber Works of Chicago, which concentrates on a general run of molded rubber goods, has recently expanded about 100 per cent and has installed larger and more modern equipment. The company is finding present business fairly good and looks forward to excellent demand for its products in the coming autumn.

Republic Rubber Picnic

Employees of the Republic Rubber Co. of Youngstown, O., attended the eighth annual picnic held by the company on July 23 at Idora Park, near Youngstown. Prizes were awarded at the games and contests.

MASON TIRE MANAGER APPOINTED TO BOARD

According to a recent announcement by William A. Cluff, president of the Mason Tire & Rubber Co., of Kent, O., A. C. Bowers, factory manager, has been appointed to a position on the board of directors of the company, and Carl Bly, manager of sales promotion, has taken over the duties of Philip Kelley, former advertising manager. Mr. Kelley, who resigned recently from the Mason organization, came to the company from the Goodyear Tire & Rubber Co., where he worked for six years in the sales and advertising departments.

The Mason textile plants, which have been idle since June 20, have resumed full operation due to an increase in the summer tire business, according to Mr. Cluff. All of the tires produced by the company, Mr. Cluff is reported as saying, are being sold and do not go into warehouses. The daily output is approximately 2,900 tires.

Geer Will Address Meeting

W. C. Geer, former vice-president of the B. F. Goodrich Co., Akron, will be one of the principal speakers at the 74th annual meeting of the American Chemical Society to be held in Detroit beginning September 6. In a three-day symposium the general subject of which will be "Chemistry's Contributon to Automotive Transportation," Dr. Geer will speak on the topic of "Rubber."

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EXCHANGE PRICES GO TO NEW LOW FOR YEAR

While a better interest was shown in crude rubber on the Rubber Exchange on July 12 by both buyers and sellers, new low prices for the year on futures were made. Heavy arrivals and reports of slackened operations at tire centers accounted for the continued pressure against July delivery, a pressure which has been manifested since the latter part of June. July sank to 34.30c on the 12th, a loss of 30 points and the lowest price on the Exchange in several years. December, which had led the market in activity, was sold by the bearish crowd in an effort to depress the whole list, and the month declined from 34.60c at the opening to 34.40c, down 30 points net.

Previous to July 12, trading on the Exchange was generally bearish, with moderate activity. Sales totaled 461 contracts on the 5th, the largest sales in the first ten days of the month. On the 13th, however, with the inauguration of lowered commission rates on crude rubber trading, the volume of sales increased with a turnover of 877 lots, the largest sales in July up to the present writing. Sales on the 12th were 401 lots. The remainder of the week prices firmed and the volume of business declined. On July 16 sales amounted to 313 lots which, considering that the Exchange was only open for the morning, was a good showing. In a majority of active deliveries prices increased a half cent. Indications of a decline in rubber stocks abroad served as a bull point and the early transactions jumped 20 to 40 points in the first hour. The trend continued definitely upward and final levels revealed advances of 30 to 50 points.

On July 18 bullish operators made a determined effort to extend the advances that featured the week-end trading, only to have the movement come to grief when realizing was attempted. The futures jumped 10 to 20 points at the start on favorable news from factory centers, but as the trading progressed offerings came forward in liberal volume. The active months ranged 20 points higher to 20 points lower, and the day's sales were 548 lots, or 1,370 tons. An unexpected development was the issue of 157 July notices during the day, although the July delivery ruled steady and closed unchanged at 35c.

Ohio Aeronautic Display

The Goodyear Tire & Rubber Co., of Akron, will conduct a display of aeronautical products manufactured by the company at the Ohio state fair.

Late Stock Prices

	Last Price July 18	Last Price July 5	1927 High	1927 Low
Ajax	—	8¼	12⅜	9
Firestone	135½	136¼	140	117
do 6% pfd.	105¼	106	107	107½
do 7% pfd.	102	102½	103½	98½
Fisk	15¾	15¼	18¼	16
do 1st pfd.	82¼	84¼	89	81
General	140	145	155	140
do pfd.	102½	102½	106	99¼
Goodrich	52	53	58¾	42⅜
do pfd.	96¼	98	103¼	95
Goodyear Com.	50½	50	53¼	29½
do pr. pfd.	110	110¼	118⅛	104½
do pfd.	114¼	112½	117	98½
Hood	—	—	47	42½
India	24	23	30	23
Intercontinental	12½	—	15¾	11½
Kelly Springfield	23⅞	23⅝	25⅛	9½
do 1st pfd.	—	—	70½	44
do 8% pfd.	—	66	70½	35
Lee	8	8	9	7
Miller	32⅞	32	36⅞	32
do pfd.	99	98	104	100
Mohawk	—	—	25	15
do pfd.	—	—	65	65
Seiberling	26¾	27	29	21⅝
do pfd.	100	99	100½	96
Star	—	—	2	2
U. S. Rubber	44	45	67½	38
do pfd.	91½	92	111¼	87
U. S. Rubber Reclaiming	—	—	12	12
do pfd.	—	—	87	87

ALLEN CO. SUCCEEDED BY NAGLE MACHINE CO.

The Nagle Machine Company, Erie, Pa. has been incorporated to carry on the business of the Allen Machine Company which was purchased by D. B. Nagle on May 13. The report that the Allen Machine Company was dissolved following its recent financial difficulties is incorrect since the plant, equipment, patents and entire business were taken over by Mr. Nagle. The new company will offer to the rubber industry an extensive line of rubber working machinery.

W. H. Shave and W. M. Jones, both of whom were previously employed by the Allen Machine Company and temporarily by the Erie Foundry Company, are now with the Nagle Machine Company.

KELLY SPRINGFIELD IS FAVORITE OF EXCHANGE

In anticipation that the earnings statement for the six months ending June 30 of Kelly Springfield Tire Co., would be surprisingly favorable, the company's stocks were an active feature of the tire group early in July, moving up on large transactions on the Stock Exchange. Kelly common touched 25⅛, a new high, while first preferred and 8% preferred rose to 70½, both being previously listed at 68 and 69 respectively. Buying of this stock was based on estimates that earnings for the first six months would leave a balance of $3 a share for the common stock. Last year the company reported a deficit of $3,439,799.

Other rubber stocks in the past fortnight have generally remained unchanged, with a possible tendency toward bearishness in the case of U. S. Rubber, Intercontinental Rubber, General Tire & Rubber and Miller. In the bond market, activity particularly in Goodyear 5s, came to a stop at the end of the second week in July. The syndicate, which earlier in the week had bought out the Goodyear bonds, had been supporting the market at 97, and it was at this price that the bulk of the short sales were made before the syndicate withdrew its support. Quotations on Goodyear bonds ranged from 94¾ to 96⅞ on July 9, when trading stopped.

Opens Australian Plant

October 1 is the date set for starting operations in the new plant of the Goodyear Tire & Rubber Co., at Sydney, Australia. According to reports coming from Akron, the Australian plant will have an initial capacity of 1,000 tires and tubes a day, with native Australians as the principal employees under the direction of experts from Goodyear plants in Akron, Los Angeles and Toronto.

Closing Prices on Rubber Exchange of New York, Inc.

JULY 5 TO JULY 18

	July	Aug.	Sept.	Oct.	Nov	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	SALES*
July 5	34.80	34.80	34.90	35.00	35.10	35.20	35.30	35.40	35.50	35.60	35.70	35.80	208
6	34.70	34.60	34.60	34.70	34.70	34.80	35.00	35.10	35.20	35.30	35.40	35.50	461
7	34.50	34.60	34.70	34.80	34.80	35.00	35.00	35.10	35.20	35.30	35.40	35.50	412
8	34.60	34.60	34.50	34.60	34.70	34.70	35.00	35.10	35.10	35.20	35.30	35.40	334
9	34.50	34.40	34.40	34.50	34.60	34.60	34.70	34.80	34.90	35.00	35.10	35.20	164
11	34.60	34.50	34.50	34.50	34.60	34.70	34.80	34.80	34.90	35.00	35.10	35.20	177
12	34.30	34.40	34.40	34.40	34.40	34.40	34.60	34.70	34.80	34.90	35.00	35.10	401
13	34.30	34.40	34.50	34.40	34.50	34.50	34.60	34.70	34.80	34.90	35.00	35.10	877
14	34.60	34.50	34.50	34.60	34.60	34.70	34.70	34.80	34.90	35.10	35.20	35.30	470
15	34.50	34.50	34.70	34.70	34.80	34.90	35.00	35.00	35.10	35.20	35.30	35.40	294
16	35.00	35.00	35.20	35.20	35.30	35.30	35.30	35.30	35.60	35.70	35.80	35.90	313
18	35.00	35.00	35.00	35.00	35.10	35.20	35.40	35.40	35.50	35.60	35.70	35.80	548

(*) In lots of 2½ tons each.

COURT DISMISSES ALL GOODYEAR LITIGATIONS

Attorneys for the Goodyear Tire & Rubber Co., presented to Judge Scott D. Kenfield of the Common Pleas court of Akron, on July 12 journal entry which dismissed all court actions against the Goodyear company and forbids bringing the same suits again into that court. Judge Kenfield signed the journal entry on July 12. This action on the part of the Goodyear attorneys was taken with the approval of the company's stockholders who were in annual session in Akron on that date.

On the same day, first mortgage and deed of trust, dated May 7, 1927, securing issue of $60,000,000 first mortgage and collateral trust 5% bonds were filed in the office of the county recorder, Akron. The document consisted of 171 pages. The $60,000,000 issue was sold July 12 to Dillon, Read & Co., who, it is said, paid a price of 96 1/6 for the bonds which are offered on the market at 97.

Joins U. S. Rubber

Eugene M.. McColm recently joined the staff of the U. S. Rubber Co., as research chemist and expects to sail shortly from the Pacific Coast for the company's plantation in Sumatra, where he will remain for the next three years

RUBBER EXCHANGE CUTS RATE OF COMMISSIONS

Rates of commission for both members and non-members of the Rubber Exchange of New York, Inc., have been cut approximately 40% as the result of the approval of an amendment voted on by members of the Exchange at a meeting held July 12. The new rates, provided for in the amendment, will save hundreds of thousands of dollars annually, it is claimed, to manufacturers who hedge their purchases. The new rates were immediately effective. They are as follows:

For a resident of the U. S. or Canada, not a member of the Exchange, $15 instead of $25; for a non-member of the Exchange residing ouside of the U. S. or Canada, $20 instead of $30; for members of the Exchange in the U. S. or Canada, $7.50 instead of $12.50; for foreign members, $12.50 instead of $17.50; for each contract bought or sold by one member of the Exchange for another, giving up his principal on the day of the transaction, $1.00 instead of $1.25.

Republic Rubber Active

J. C. Connors, vice-president and general manager of the Republic Rubber Co., of Youngstown, O., reports that the company's business has recently been showing improvement, and that plant operations are now on about an 80% basis. The company manufactures tires and tubes and mechanical rubber goods.

New Name for Rubber Co.

It was recently announced by officials of the Bourn Rubber Co., of Providence, R. I., that the name of the firm had been changed to the Phillips-Baker Rubber Co. The company manufactures waterproof and canvas footwear.

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TIRE ENGINEER EXPECTS MOTOR TRUCK ADVANCE

The loss of time in the transportation of commodities will be cut greatly within the next few years by the use of the motor truck, according to Alvin N. Day, transportation engineer of the Goodyear Tire and Rubber Company, who spoke before the Los Angeles section of the S.A.E. recently. In shipping by rail, Mr. Day said, 60 per cent of the elapsed time between shipper and consignee occurs at terminals. Increased trucking facilities is the proposed remedy for this condition. Motor trucks are today rendering a service of only 16 billion ton-miles per year whereas the railroads are rendering 414 billion ton-miles.

Mr. Day states that at the present time 2,000,000 pneumatic-tired trucks, mostly of ½ to 1-ton capacity, are in service in the United States, that 333,000 trucks are equipped with solid tires and that 140,000 are fitted with pneumatic tires of 6-in. size and larger. These figures do not include 26,000 motor-coaches.

Medina Exhibits Products

The Medina Rubber Co., of Medina, O., manufacturers from reclaimed rubber of laced tire boots and cement and gum-covered tire patches, conducted an exhibit of its products recently in a bank in Medina. The Medina company came into existence in 1922 as the result of the effort of the defunct Akron Universal Rubber Co., to manufacture the "Keck" boot. When the Akron Universal company dissolved, the right to manufacture the boot reverted to the originator, the late H. C. Keck. S. E. Johnson, secretary-treasurer of the Medina company, joined Keck in forming the Medina firm which has continued since. A. O Johnson is president.

Partridge Rubber Sale

Bids for the purchase of the bankrupt Partridge Rubber Co., Ltd., located at Guelph, 60 miles from Toronto, Canada, were recently received by the trustee of the company, John B. Robertson, Federal Trust Building, Toronto. The factory of the Partridge company is of reinforced concrete and steel, 58x250 ft. with three stories and basement. In addition, the plant comprises a factory extension and office building, a boiler room and other small buildings. It is served by the Canadian Pacific.

Mansfield Tire Busy

The Ashland, O., branch of the Mansfield Tire & Rubber Co., of Mansfield, O., is reported to be at the peak of its business, with employees working in three shifts to produce 1,800 tires a day, an increase of nearly 600 tires over previous records. The parent factory in Mansfield is also said to be busy, producing in the neighborhood of 5,000 tires a day.

X-RAY MAY TELL STORY OF SYNTHETIC RUBBER

The formula for the successful artificial reproduction of rubber may be disclosed by the use of the x-ray, according to George L. Clark, professor of chemistry at the Massachusetts Institute of Technology, who was one of the speakers recently at a session of the Institute of Chemistry of the American Chemical Society at the Pennsylvania State College. Mr. Clark in his address before the session said that experiments now in progress may eventually enable the chemist to produce a successful synthetic product.

Mr. Clark is quoted as saying: "'X-ray photographs show the amorphous pattern for unstretched rubber, and the fibre crystal structure of stretched rubber. That this is due to the rubber hydrocarbon is demonstrated on very pure soluble rubber. The most interesting feature at present is that no sample of synthetic rubber has been found to produce this sharply fibered diagram. It is possible that this is the criterion of the successful reproduction of rubber."

Appleton Elects Officers

The Appleton Rubber Co., of Franklin, Mass., recently held a meeting of stockholders at which H. O. Phillips was elected president, J. E. Cameron, treasurer and general manager, Paul O. Lawton, secretary, and assistant treasurer, and Robert Cowen, factory manager.

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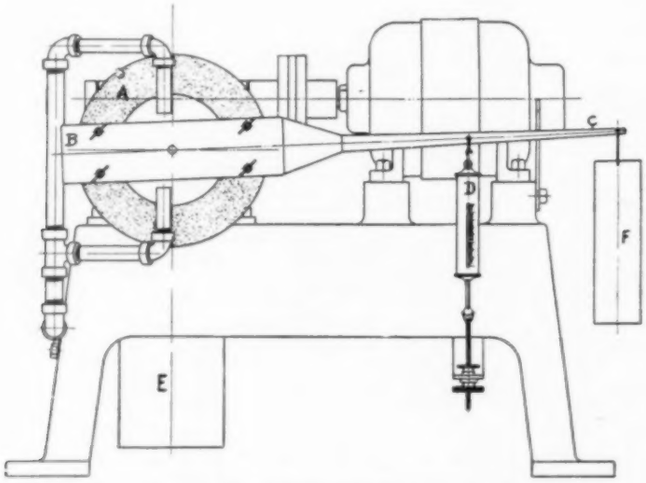
New Equipment for Rubber Factories

GRASSELLI INTRODUCES NEW ABRASION MACHINE

THE RUBBER service department of the Grasselli Chemical Company has announced the Grasselli Abrader for measuring abrasion and resistance to wear. This piece of equipment was referred to at length in a paper entitled "Measurement of the Abrasion Resistance of Rubber" which was read by Ira Williams before the Richmond meeting of the American Chemical Society in April. Mr. Williams was the recipient of the Grasselli fellowship on accelerators at Mellon Institute, Pittsburgh, which expired this spring.



Outline Drawing of New Grasselli Abrasion Testing Machine Showing Clearly the Various Working Parts.

The Grasselli abrader is a machine for measuring the volume loss of rubber per unit of work expended. Its principal is similar to that of a prony brake in which the rubber test pieces are similar to the friction surfaces of the brake.

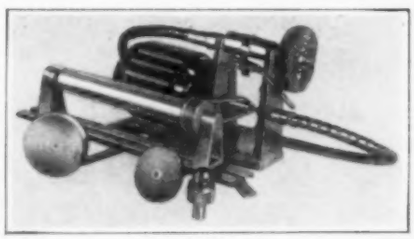
As marked on the accompanying diagram, the essential parts of the Grasselli abrader are the abrasion disc A which carries the abrasive paper, balance lever B which carries the test samples, load weight E which holds the test samples against the abrasive, spring balance D and balance weight F which combined serve to prevent rotation of balance lever B.

Duplicate test pieces or blocks are required for each test. These are carefully weighed. The clamps for holding the test pieces are attached to balance lever B by wing nuts. The balance lever is then placed in position so that its shaft extends through the hollow shaft of the abrasion disc. To the end of its shaft the weight E is connected to hold the test pieces evenly against the abrasive surface. The rapidity of the test may be increased through filling the weight E with shot. After the spring balance is adjusted, the time is recorded and the motor started. Readings are taken at intervals and at the end of the test the samples are removed and weighed. The comparative results are easily computed according to formula.

The over-all size of the abrader is 21½" by 12½"; its height is 17½". A six-cavity mold for test pieces is furnished with each machine. A booklet completely descriptive of the new equipment will be sent by the Grasselli company on request.

IOWA COMPANY MAKES PORTABLE REFINISHERS

The Matthews Manufacturing Co. of Newton, Ia., has brought out two portable refinishing and buffing machines. Model M-1 is designed especially for refinishing aluminum and copper washing machines, but it can also be used for all kinds of finishing operations. In the illustration it is shown with a wringer-roll attachment.



Model M-1 Matthews Buffer

Model M-1 is mounted on a base 9x14 in. and is 10 in. high. The entire unit is mounted on a compact bench-type swivel tripod. When not in use, the shaft handle rests loosely in two sockets. These sockets are equipped with a concave hinge that springs closed and forms a rigid portable emery wheel stand. The motor is rated at ⅓ hp. and operates at 3,400 r.p.m. It is designed for use on 110-volt, 60-cycle current.

The M-2 (not illustrated) has a ½ hp. motor operating at 1,725 r.p.m. and is for use on 110-volt, 60-cycle circuits. The base measures 12x18 in. and is mounted low on casters. The motor carries a two-step grooved aluminum pulley driving a similar pulley, mounted on the countershaft, through a Graton & Knight link-leather V-belt. Two speeds are available of 1,000 and 3,500 r.p.m. on the flexible shaft. The same equipment is used on this machine as with the Model M-1 except that the shaft is one foot longer and the wire wheels 6 in. in diameter.

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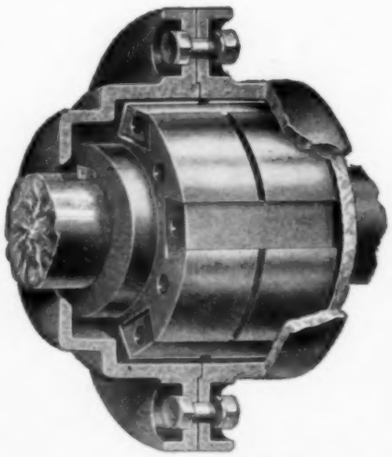


Nicholson Flexible Coupling

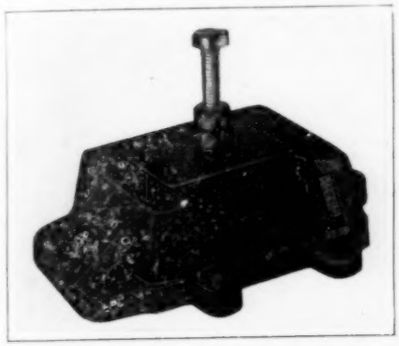
W. H. Nicholson & Co., Wilkes-Barre, Pa., are manufacturing flexible couplings with improved lubrication features. In the accompanying illustration it will be noted that holes are drilled longitudinally through the floating keys and the hubs. These holes act as reservoirs for oil. A lip has been extended from this casing over the left hub of the coupling, and into this lip oil can

(Continued on Next Page, Second Column.)

New Equipment for Rubber Factories

DEVICE TO ELIMINATE VIBRATION AND NOISES

Vibration in machinery subject to heavy impacts is the cause of noise, wear and damage to both equipment and buildings. The Korfund Vibro-Damper, shown in the accompanying illustration, is designed for placement under machine bases to



"Korfund" Vibration Damper

deaden vibration and noises and to protect the machinery from the effect of high frequency vibrations.

According to the manufacturers, the damper is built in five sizes to sustain loads between 30 to 4,000 lbs. Its construction is unusually compact. The additional height given to the machine is so small that it will not interfere with operation nor affect stability. In special cases it may be placed in a depression of the floor reducing the increase in height to a minimum.

The outer housing, a strong and sturdy casting, rests on a base plate to which it is securely bolted. The inner walls are completely covered with an isolated material which is adjustable in the larger sizes of dampers. Thus the spring casing supporting the machine is resiliently separated from the housing and foundation under the damper. The spring casing encloses one or more springs, the tension of which can be adjusted in the simplest manner by means of the same bolt which holds the machine base to the spring casing. The height of the damper is not affected by the spring adjustment. The conical design of spring casing and outer housing effectively prevents any misalignment of the machine. Any such tendency is immediately counteracted by the greatly increasing pressures set up by the conical surfaces. (The Korfund Co., Inc., N.Y. City.)

$500 For Firestone Man

The Firestone Tire & Rubber Co., of Akron, has awarded $500 to George B. Nichols, one of its employees, who proposed an improved method of splicing treads, and who assisted in preparing the equipment to carry out his idea. The Firestone company made similar smaller awards to other employees who submitted suggestions for labor saving and economical devices.

New Post for Goodrich Man

Ed Barry, maintenance engineer for the B. F. Goodrich Co., will leave sometime in the middle of July for the Pacific Coast where he will become resident engineer of the new Goodrich factory which is to be built in Los Angeles, Calif. Mr. Barry has been associated with the Goodrich company for 18 years.

Improved Flexible Coupling

(Continued from Previous Page)

be squirted, either while the coupling is idle or in motion.

With the added space provided by the holes in the lip, the coupling is said to carry approximately 150% more oil than the older type manufactured by the company. The improved type is known as Style A and the old type, without the oil lip, as Style B.

Tire Flap For All Tires

A newly patented tire flap made long enough for the largest of several tire sizes, and marked so that it may be cut off and apertured for smaller sizes, is being marketed by C. O. Tingley & Co., of Rahway, N. J. The company claims that the flap greatly lessens the quantity of flaps which dealers must carry in stock and prevents the motorist, when fitting a new flap, from discovering that he has the wrong size. It is only necessary for the purchaser to buy one flap which he may cut to the size which he finds marked on the tire. The holes are made by folding the flap lengthwise and cutting into the double edge on the makings with a small-bladed penknife.

POWER TRANSMISSION MEN HOLD CONFERENCE

The Power Transmission Association, with headquarters in Philadelphia, recently held an advertising conference in Cleveland. Several representatives of trade papers were also present. It was decided at the conference that the whole field of mechanical power transmission was too large to be analyzed in detail before the meeting of the association in September at French Lick, Ind. Slogan emblems were considered, and various channels of advertising the work of the association were reviewed. A paper covering an analysis of advertising in trade publications used by the members of the association was read by H. S. Trecartin, who is conducting a survey of this field for the organization.

Seaboard Rubber Receiver

A receiver for the Seaboard Rubber Co., successor to the Atlantic Rubber Co., of Baltimore, Md., was recently applied for in the Circuit court by William G. Wetherall. It was alleged in the bill of complaint that the defendant owed the complainant $295 and was unable to meet its obligations in the usual course of business.

New Self Adjusting Flap

A new self adjusting flap made of two plies of fabric and one extra heavy ply of rubber, molded to fit the casing, is announced by the Gates Rubber Co., of Denver, Colo.

The flap is said to be non-absorbent and waterproof and will not easily rust the rim, which frequently occurs, causing damage to the tube. The valve stem is inserted through the hole in the middle point of the flap, locking the stem in position. The ends over-lap and are self adjusting, fitting any size of passenger car tire. The Gates Company are also manufacturers of the "Fitsall" flap.

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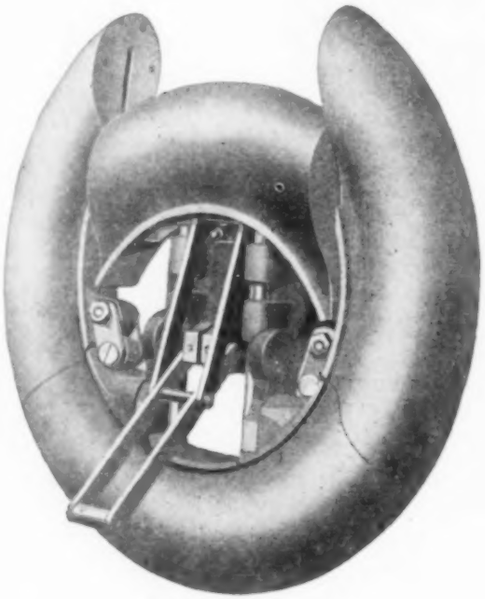

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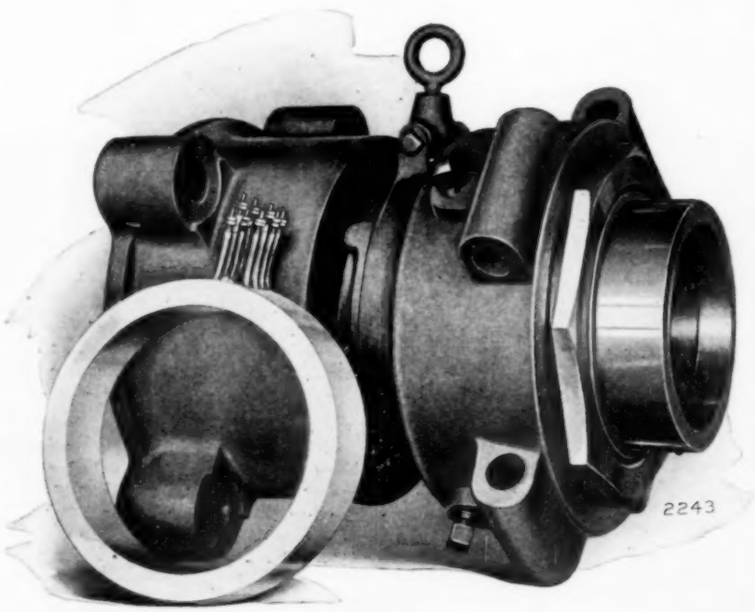
Tire Molds AKRON OHIO *Special Machinery*

★ [LICENSED BY INDIA MACHINE & RUBBER MOLD CO.]

ROYLE Inner Tube Head

This head on a Royle Perfected Tubing Machine produces seamless, uniform tubes without grain or spider marks.



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P. L. PALMERTON — President and Editor

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Better Manufacturing Conditions

IN A RECENT issue of this journal there was published an article on the marketing of rubber footwear seconds in which it was incidentally stated that for no more than four to five per cent of the production to be classed as seconds is regarded as a good record in a rubber footwear plant. In questioning this statement a superintendent of long experience pays tribute to the assistance which the industry has received from its suppliers and equipment manufacturers in delivering better goods to the public.

To the superintendent's mind, a record of four to five per cent of seconding could have been considered satisfactory a couple of decades ago but can scarcely be accepted complacently today. The reasons for the changed situation reflect the improved conditions under which all parts of the rubber industry work today as compared to twenty years ago.

In those days, our correspondent points out, quality was rendered uncertain by several basic factors. To begin with, crude rubber grades were not yet standardized. Both the American and African tropics were sending to market all the various rubbers they could find in their jungles and out of the East was coming the first sizeable shipments of the plantation product. Disappointment with rubber was frequent in the factory.

Again, the reclaimed rubber of that day, then referred to as "shoddy", was not properly devulcanized and carried free oil and sulphur. The sulphur, litharge and whiting were often gritty. Footwear fabrics were sometimes faulty or punctured when being coated or had been injured by imperfect dyes. The mechanical equipment, although then regarded as excellent, was certainly inadequate as compared to that available today.

Factory arrangement and service was less efficient and reliable twenty years ago as, for instance, the water supply for mills and calenders was frequently spasmodic. On the mill room floor alone so many things could happen to interfere later with good results that it is a wonder there was not more seconding.

But times have changed and these old-time obstacles have largely disappeared due to suppliers and equipment manufacturers joining hands to give the industry better facilities for the production of perfect goods. Better machinery, lighter and cleaner workrooms and reliable supplies have reduced the hazards of seconding in the preliminary steps of rubber footwear manufacture. The subsequent operations are confronted with the same hazards as always but these are largely under control of the factory itself.

The list of causes of seconding in rubber footwear manufacture is a long one but most of them bear some relation to poor workmanship or even carelessness. The excuse for this may be that a shoe passes through so many hands from the assembling of the raw material to the finished article that it is a wonder it so generally escapes accident or carelessness and finally arrives in perfect condition.

Imperfections in footwear are hard to conceal and it is almost impossible to touch up a vulcanized shoe to improve its appearance. Tires, molded articles, and mechanical rubber goods that are imperfect may be buffed and burnished and very slight blemishes are covered by blooming. For boots and shoes both buffing and sulphuring are objectionable. Skilled shoe makers are always in demand and teaching new help to become expert is a slow process and is responsible for much seconding.

In justice to a plant that confesses to four or five per cent of seconding, the superintendent concludes, it should be said that there are some others claiming a modest one and one-half per cent that could show double that amount without straining very hard. In some plants no shoe is punched as a second unless it has a "real" defect. Strict inspection in all departments and taking full advantage of the reliable supplies and equipment now offered will bring down the percentage of seconds produced in almost any plant.

Rubber Exchange Fees

IN REDUCING its commissions by approximately 40 per cent the Rubber Exchange appears to have taken a distinct forward step which will greatly widen its field of service. The Exchange was designed to broaden the area of rubber trading, particularly among the manufacturers. The lower price will probably prove an inducement to them to take greater advantage of the facilities which the Exchange provides. Although opposed by some of the members, the commission cut appeared to be justified by immediate increased trading on days which had no unusual attraction for the trader. The reduction will not only save thousands of dollars for the manufacturers who trade or hedge on the Exchange but will induce the small traders to come in and go out of the market more freely than in the past. The stimulation of greater interest will prevent the lower fees from meaning a lowered income for the brokers since more new customers should appear and the old ones be found paying commissions more frequently.

On the first two days following the commission cut there were 1,347 lots traded on the Exchange as compared with 578 lots on the last two days at the old rates. This increased activity was not sustained on the third day but the early evidence was certainly that the volume of trading would be increased by the smaller fees.

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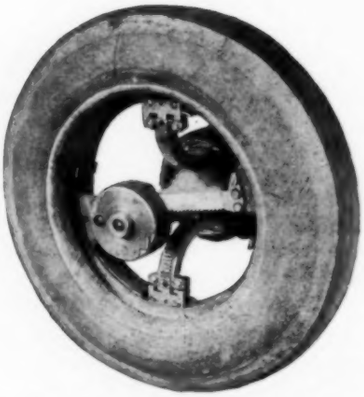

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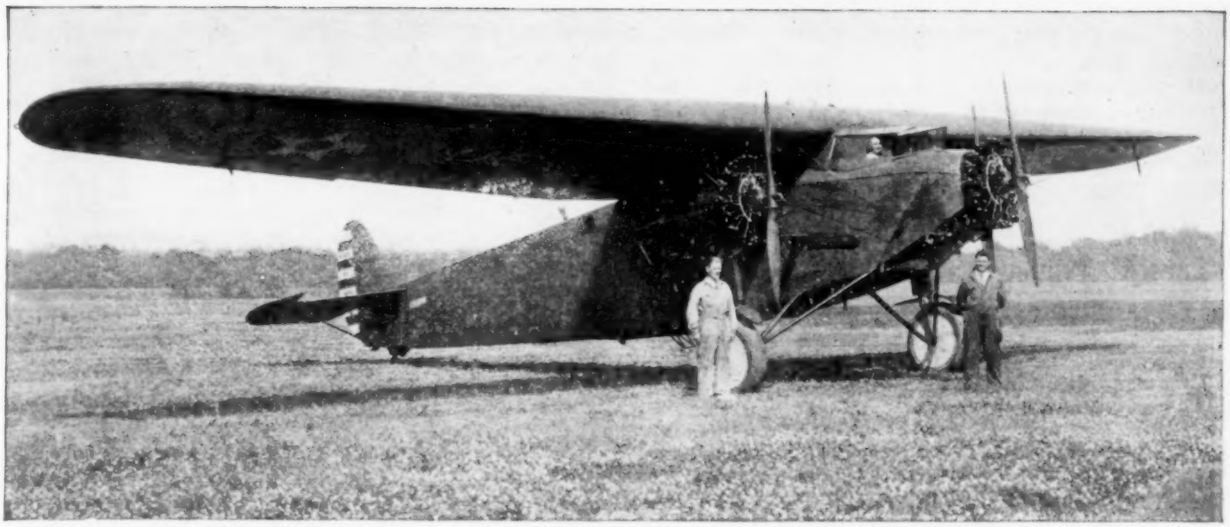


Some Technical Problems of Rubber in Aviation

The Author, a Well Known Aeronautical Engineer, Suggests to Rubber Manufacturers Ways and Means of Furthering the Use of Rubber in Aviation

By W. Laurence LePage

Former Editor of AVIATION Magazine; now with Pitcairn Aviation, Inc.

IT MAY BE said, to use a paradox, that the use of rubber in aviation actually dates back long before its employment in the construction of aircraft. Probably to the pioneer Pinaud, whose model airplanes propelled by means of twisted strands of rubber were among the earliest to demonstrate the possibilities of stable heavier-than-air flight, belongs the credit for first realizing the possibilities of this most versatile of natural products in the development of flying.

However, it is neither into the realms of legend nor into the academic uses of rubber that it is proposed to carry the present discussion but rather is it the intention of enunciating the present aircraft problems in the solution of which rubber offers, and in fact is already giving, promise. From this, bearing in mind that perfection in the application of rubber in aeronautical problems has not yet been reached, it is hoped that ways and means may be suggested for furthering the value of this product to the aeronautical engineer. It should, however, be stated here that there is no intention of entering into a discussion of the application of rubber in what is called lighter-than-air flight, namely, that of balloons and airships, in which the problem is mainly one of adequately proofing fabric in order to obtain a minimum of leakage of lifting gas.

It would seem that the first actual use of rubber in aircraft construction dates to the time when an airplane was first equipped with rubber tires on its landing wheels. While at that early stage in the development of flying little attention was given to the requisites of this particular application of rubber, there is no doubt that with modern growth the question of the airplane tire has become a real problem to which reference will be made later. The landing problem in airplanes is, mainly, one of shock absorption and in this respect it is only comparatively recently that close attention to the airplane tire as a medium for shock absorption upon a large scale has been given. Primarily, the shock absorption problem was purely one of especially designed shock absorbers adapted to the peculiarities of airplane work.

Study of Shock Absorber Problem Needed

The function of the shock absorber of an airplane is to provide a means whereby the energy due to the vertical component of the velocity of an airplane on landing may be taken up and then dissipated. Many shock absorbers store up this energy but do not dissipate it and it is upon this dissipation problem in the case of rubber for aircraft undercarriages, that more work is needed.

Now, the energy given to rubber during loading may conveniently be divided into three divisions for the purpose of consideration, namely:

(1) Strain energy which is reversible;
(2) Heat energy which is also reversible; and,
(3) Frictional energy which is irreversible.

This latter item, which is known as hysteresis, is by far the most important of the three and the one factor which it is desired shall, within reason, be as great as

possible for it is upon the magnitude of the hysteresis factor that the dissipation qualities of a rubber shock absorber depend.

The load-deflection diagram of a typical rubber shock absorber is somewhat as shown in Fig 1. The upper curve represents the extension of the rubber during loading, while the lower curve represents the return to normal upon unloading. In this diagram, the:

Area ABCDE=the energy put into the absorber (resilience); the
Area AFDEA=the energy given back by the absorber; and the
Area ABCDFA=the energy dissipated, i.e., hysteresis.

From this diagram it will also be seen that the maximum load for absorbtion is also limited for there is a load above which the shock absorber ceases to function as such, namely, that load in the diagram corresponding to the verticallity of the load curve.

In actual practice it is the custom to employ rubber for shock absorbtion in aircraft undercarriages in the form of cord which is wrapped around the structure of the undercarriage near each wheel and the wheel axle at that point. The axle is free to move in a vertical plane restrained only by the tension of the rubber binding. From what has been said it will be seen that the aim of the rubber cord manufacturer should be that of increasing, within reasonable limits, the hysteresis effect of the rubber with corresponding increase in the shock dissipation qualities of the rubber. The aircraft designer wishes not only to absorb the shocks of landing but also to reduce as much as possible the bounding which would be inevitable if all of the energy transmitted to the shock absorber were reversible.

With a view to satisfying these and other requirements, rubber cord for aircraft work is of the braided variety. Ordinary braided rubber cord is made up of a large number of strands of rubber, usually about 1/30 in. square in section, covered by two layers of braiding. The strands are made of fine hard Para rubber, and are very extensible, the ultimate strain at fracture being generally between 7 and 8 (i.e., length at fracture is eight to nine times initial length).

In the manufacture of the cord, the braiding, which is formed of coarse cotton or twine, is put on while the rubber is considerably extended. As compared with the rubber, the braiding is practically inextensible, so that when the tension on the rubber core during braiding is removed the braid exerts a radial compression on the rubber, (which has, of course, shrunk in diameter due to extension) thus preventing the core from returning to its original length. The rubber core, therefore, is permanently held with an initial strain in it.

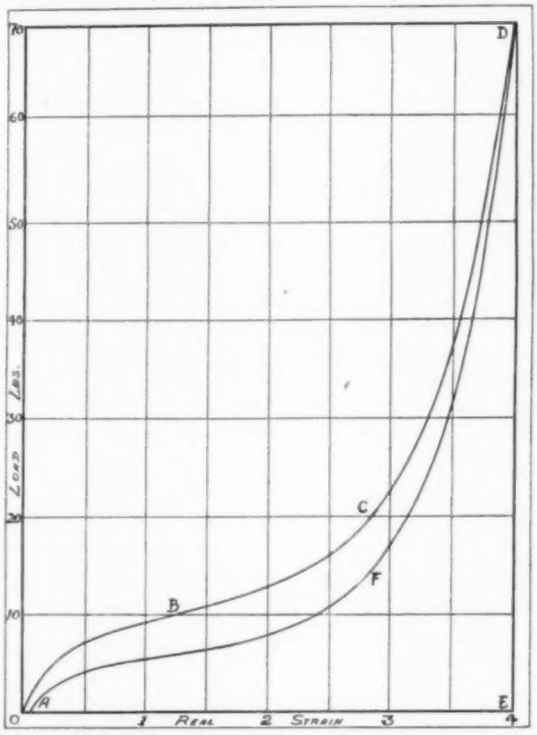
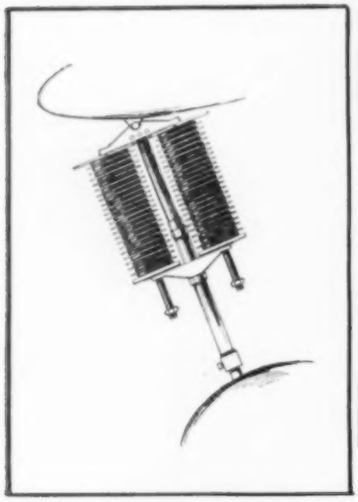
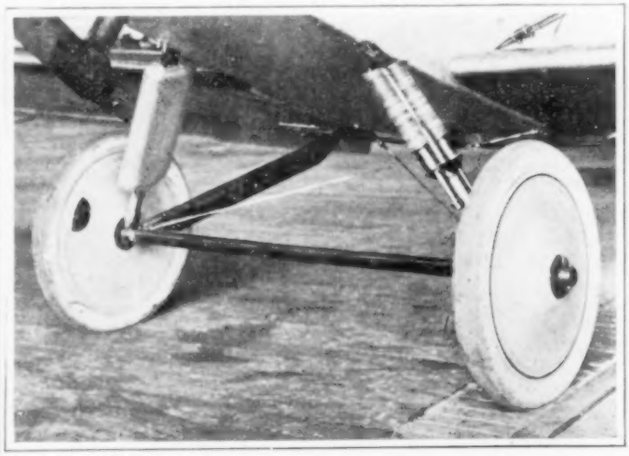


FIG. 1—Load-Extension Diagram for Rubber Cord

From the diagram in Fig. 1 it will be seen that maximum extension for a given increase in load is obtained in the region after the initial extension has been applied. Again, from the nature of the work which is required from a rubber shock absorber in an aircraft undercarriage, it is obviously inadvisable to stretch the cords to a greater nominal strain than 1 (i.e., 5 in. of cord stretched to 10 in.). The function of the braid is to maintain an initial tension in order that, in practice, the rubber may start taking load at the flat and most efficient part of the curve. Furthermore, by initially straining the rubber it is possible to take full advantage of the extensibility of the rubber without the abnormal extension which would otherwise be required. At the same time since hysteresis increases with ex-



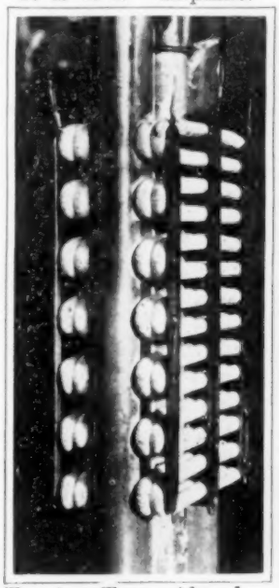
Diagramatic Drawing of a Compression Rubber Shock Absorber.



A Typical Compression Rubber Shock Absorber
The right leg of the undercarriage shows the stream-lining removed and reveals the rubber discs placed between metal spacers.

tension, the braiding also has the effect of enhancing this important factor in the rubber cord.

From the practical standpoint, however, the problem is by no means adequately solved since the few experiments which have been made seem to indicate that the hysteresis energy shrinks to a very small percentage of the total with rapidly alternating loads, such as are experienced in the landing of an airplane. It is to a certain extent this fact which has lead to the development of what is known as the Oleo type of shock absorber for aircraft in which the principles involved are purely pneumatic and hydraulic. The rubber shock absorber is, however, considerably cheaper and lighter and is in every way more suitable mechanically for small aircraft than is the Oleo type. Consequently, the satisfactory overcoming of the hysteresis problem—in other words the improvement of the energy dissipating qualities of rubber—is highly important.



Tension Type Absorber
This type of absorber consists of endless rings, 10% of which can be broken and enough strength will be left to effect a safe landing.

There are, in addition other problems which have called for consideration with a view to improving the mechanical conditions entering into the use of rubber for aircraft shock absorption purposes. In the process of braiding rubber cord in long lengths, complications arise due to the fact that slip in the applied tension in the manufacturing machine is inclined to cause irregularities in the final initial strain given the rubber. Such irregularities are bound to cause trouble and result in weakened spots when the cord is wrapped on an undercarriage axle and subjected to landing loads. Furthermore, even in the process of wrapping it is almost impossible to maintain constant uniformity of tension.

With a view to overcoming these troubles, the ring cord has been developed. In its manufacture there is far less rubber under strain at one time and consequently the possibilities of irregularities in the initial extension are very much less.

In the case of such a rubber cord ring, it has been found that, if thoroughly wetted when under a load sufficient to produce about 50% extension, a permanent extension of about 8% measured on the straight length is obtained, the ring returning to its original dimensions as the moisture evaporates. In the process of binding up an undercarriage, therefore, it has been deemed advisable to employ rings of rubber cord which are approximately 8% short in circumference, provided that these are placed in position over the undercarriage structure after saturation with water when under tension. When dry, the initial tension corresponds with the load required to produce an 8% extension and the tension when in position in the undercarriage is constant and uniform. If a method could be found whereby such a rubber cord ring, after having been saturated with water under tension, could be treated by the manufacturer so that it would retain the 8% extension upon drying, subject to the application of a chemical liquid solution which would allow it to shrink to normal when in position in the undercarriage, the ease of fixture and the maintenance of spares would be greatly improved.

Reverting to the question of the design of pneumatic rubber tires for aircraft, it would seem that the problems are solved, at least as far as general requirements are concerned. It has long been realized that the very considerable lateral loads to which airplane tires are subjected present peculiar conditions not encountered in the design of tires of automobiles. These lateral loads are caused by an airplane landing in a cross-wind with the resultant tendency for the direction of motion to be diagonal to the fore and aft axis of the airplane. Furthermore, it not infrequently happens that at the moment of touching the ground the plane of rotation of the wheels is not exactly parallel to the path of flight.

To overcome the possibility of tires being thus sheered off, especially designed rims have been produced which resist lateral loads and stresses. Owing to the possibility of the bead of the tire lifting and the inner tube blowing out, in the event of serious side loads being experienced, a particular form of hook bead has been used in some cases with success.

In the case of very large airplanes such as heavy bombers or multi-engined passenger airliners, it has become a practice to employ very large tires of the balloon type with a view to employing the shock absorption qualities of such a tire to augment those of the main shock absorbers. The results of this practice have been found highly successful and there is likely to be an increasing demand for very large size airplane tires of this type. Furthermore, there is an added advantage, which in the case of large size tires, becomes of material importance. It has been demonstrated by experiment that the hysteresis effects in pneumatic tires behave somewhat differently from those of normal rubber shock absorbers. In the latter, as has already been said, the hysteresis diminished very rapidly, almost to disappearance, when the loads are rapidly alternating, such as in the case of an airplane landing. For pneumatic tires, however, the case is diametrically opposite and the hysteresis in a large balloon type tire actually increases with the rate of loading, indicating that there are material shock dissipation qualities present.

There is a possible advantage to be obtained by the use of solid or cushion tires for aircraft work since these would have a marked tendency to reduce oscillations. All that would be necessary, provided that normal shock absorbers were fitted, would be for such tires to have a shock absorbing capacity capable of dealing with the kinetic energy of the moving parts of the undercarriage. The great disadvantage, however, lies in the weight problem which would probably be very material in the case of solid tires. The writer is unaware of any practical use being made of such tires in aircraft, although there are undoubted advantages if a suitable rubber could be found.

Turning from the main use to which rubber is put in the construction of airplanes, there are many other problems, the solution of which can be found in the use of rubber. Very naturally the employment of rubber tubing for gasoline leads from tank to power plant presents many attractions not the least important of which is the fact that such a flexible material as rubber will not transmit vibration from the engine to the tank connections and thus cause a fracture. Unfortunately, how-

ever, rubber is very seriously affected by gasoline unless specially compounded, the material being reduced to a glutinous pulp after a short immersion in any hydrocarbon.

So urgent was the need, however, for a form of flexible tubing which would resist the effects of gasoline and which could be used in small lengths for making flexible connections, etc., that, during the war, extensive experimental work was carried out in the production of a form of protected rubber hose. As a result of this work there was developed especially for aircraft purposes a flexible tubing which became known in Europe as P.R. (Petrol Resisting) Hose.

This P. R. Hose was in reality normal rubber tubing with a very carefully prepared lining of canvas. In manufacture the rubber was applied to the canvas in much the same manner as that employed in the manufacture of tires. In this way it became possible to employ rubber tubing in short lengths in the fuel leads on airplanes but some idea of the difficulties of manufacture and the demands made upon this P. R. Hose may be gathered from the standard test through which every sample had to pass before acceptance. This test consisted of a demonstration of the fact that the sample would withstand one hour's immersion in boiling gasoline followed by 23 hours in cooling gasoline.

By way, however, of showing the diversity of requirements in the use of rubber in aircraft work, another problem arising in the construction of military aircraft may be mentioned, namely, the construction of bullet proof gasoline tanks. During the latter stages of the war, a number of different methods of rendering fuel tanks bullet proof were suggested, none the least successful of which was that in which an ordinary metal tank was covered with a coating of rubber. The outer covering of rubber was usually about ¼ in. thick and the principle applied was that in the event of a bullet piercing the tank, the rubber would immediately tend to close up around the hole and prevent the leakage of gasoline which, apart from the actual loss of fuel, might be the cause of fire breaking out.

It will readily be seen that in this case, the problem was diametrically opposite from that which faced rubber manufacturers in the production of P. R. Hose. In the case of the covering for gasoline tanks, the greater the tendency of the rubber to swell and become glutinous under the action of gasoline, the greater would be its efficacy in preventing a leakage. As a matter of fact, the problem of a bullet proof fuel tank has never been solved to entire satisfaction and with the conclusion of hostilities, efforts towards this end became less sincere.

Rubber is, of course, employed in many other places in a modern airplane but in no other case is there to be found a particular requirement presenting new problems worthy of mention. Rubber is employed in the manufacture of parachutes where carefully placed strands serve the purposes of quickly opening the pack and permitting the parachute proper to be pulled out by the pilot-parachute upon the pulling of the "D" ring by the parachutist. And, lastly, what better symbol of the important part played by rubber in the development of aviation can be cited than that of the recent use of a collapsible rubber boat in saving the lives of Commander Byrd and his three companions in their unsuccessful attempt to reach Paris by air only a few weeks ago. Their rubber boat turned what would have been certain disaster into a glorious triumph.

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The Influence of Moisture on Rubber Testing

Paper Read at A.S.T.M. Meeting Discloses That Moisture Plays a Large Part in The Properties of Rubber Goods and that Humidity Should be Controlled

By Fred S. Conover and Harlan A. Depew

Research Division, New Jersey Zinc Co., Palmerton, Pa.

A GREAT DEAL of the work of our laboratory consists in the testing of zinc oxides for rubber purposes. This is divided into two parts: the control grading of shipments and the evaluation of experimental zinc oxides. The testing of zinc stocks with their well-known knotting properties is unusually difficult and we realized early in our work that it was necessary to study our testing methods and improve upon them.

As a result of this study and the subsequent introduction of a number of innovations, we increased the accuracy of our testing very appreciably. Among the innovations were the installation of laboratory roll thermometers which enabled our laboratory operators to mill the rubber at constant temperature, and the adoption of a constant-temperature testing room.

In order to obtain the greatest value from our testing laboratory we feel that it is necessary still further to increase our testing accuracy. We have noticed that a recure of a stock that has lain in the laboratories for a couple of weeks often will not check earlier tests. We have also observed that a "laboratory control sample" of a definite formula tests differently from season to season.

It has been suggested, from analogy to paint testing,[1] that variability in moisture content might play an important part in explaining these discrepancies. There were no published rubber test upon which to base this conclusion until Stringfield's paper[2] was presented, in which he gave data showing that relative humidity was a real factor. This paper, however, did not make any recommendations for laboratory control and the question was left unanswered as to whether it was necessary to apply humidity control during milling, whether it was necessary to apply a control to the crude rubber before milling, and what humidity control should be adopted.

We were sufficiently impressed by the importance of this report to start a testing program to check Stringfield's conclusions, and to standardize on a humidity control, if we found it desirable.

Keeping Moisture Content Constant

In this program we assumed that the testing variation produced by different conditions of humidity depended on the variations of moisture content, and that conditions of laboratory control should be chosen that would keep the moisture content as nearly constant as possible.

In order to carry out our experimental work it was necessary to have a continuous stream of dry air passing through one storage cabinet and a corresponding stream of moist air passing through another. Dehydration by silica gel was the means decided upon for securing the dry air. For the moist stream, air was bubbled through three bottles containing water and glass wool.

Three widely divergent mixes were chosen as being representative stocks. The first was of a highly hygroscopic nature, containing latex sprayed crude rubber, hexamethylene-tetramine and glue. The second contained less hygroscopic material, pale crepe, XX Red zinc oxide and Diphenylguanidine. The third was a reclaim compound containing litharge as the accelerator. These compounds are:

Compound A		*Compound B*		*Compound C*	
Latex Sprayed Rubber	920	Pale Crepe	920	Whole Auto Tire Reclaim	742[a]
Sulfur	55	Sulfur	55	Pale Crepe	460
Glue	67½	D. P. G.	4½	Sulfur	74
Hexa	9¼	XX Red Zinc Oxide	1035	Litharge	185
XX Red Zinc Oxide	1035			XX Red Zinc Oxide	1035

[a]Contains 460 parts (500 volumes) of rubber hydrocarbon.

Each of these batches was mixed on a 16 by 42-in. mill and allowed to cool. Samples of 500 g. were then taken and, after an interval of about a week, were placed in the wet and dry cabinets for 10 and 20-day periods, after which they were weighed. Table I shows the amounts of moisture taken up or lost by these samples. Since the stocks were allowed to lie around to pick up moisture we can observe change in both directions.

TABLE I.—CHANGE IN MOISTURE CONTENT OF UNCURED STOCKS WHEN EXPOSED TO 0 PER CENT AND 100 PER CENT RELATIVE HUMIDITIES. Values are expressed in grams change in weight of 500-g. samples

	Exposure Period			
	10 Days		*20 Days*	
	Wet	*Dry*	*Wet*	*Dry*
Compound A	+1.7	—2.6	+2.3	—2.8
Compound B	+0.6	—1.1	+0.6	—1.1
Compound C	+0.8	—1.9	+1.3	—2.0

The samples kept dry show a gradual loss of their original moisture content as the exposed periods lengthen. At the end of the 20-day period they contained practically the same amount of moisture which they had when they were cut off the mill. The hygroscopic compound A, since it had the highest initial moisture content, lost the greatest amount of moisture. Compound B had the lowest initial moisture content and lost less weight than compound A. The reclaim mix, compound C, showed a much faster rate of change in weight than compound B and was nearly as hygroscopic as compound A that was chosen from especially hygroscopic materials. This high moisture absorption of a reclaim stock is, incidentally, a source of trouble in manufacturing. It is our opinion that more trouble, due to blistering, is caused by failure to dry reclaim mixes thoroughly than from all other reasons.

The samples kept in the wet box show steady increases in weight as the exposure periods lengthen with the exception of compound B which is practically at equilibrium at the end of ten days.[1] The others have not come to equilibrium

[1]H. A. Nelson and G. W. Rundle, "Further Studies of the Physical Properties of Drying-Oil, Paint and Varnish Films," *Proceedings*, Am. Soc. Testing Mats., Vol. 23, Part II, p. 356 (1923).

[2]R. B. Stringfield, "The Effect of Humidity on Rubber Testing," *Industrial and Engineering Chemistry*, Vol. 17, pp. 833-835, August, 1925.

[1]C. R. Boggs and J. T. Blake, in the *Journal of Industrial and Chemical Engineering* for March, 1926, Volume 18, No. 3, have published data on the rates of absorption of water by uncured samples of different rubbers. They found wide variations, depending on temperature, osmotic pressure, surface tension, and the type and concentration of the coagulant. Reclaimed rubber was found to have a very high rate of increase. Most of their work was done by actually immersing the samples in distilled water whereas the work here has been done at 100 per cent relative humidity. However, it is probable that rates of absorption are not much different at 100 per cent relative humidity from what they are at actual immersion for the same length of time. (See also the *India Rubber Journal*, Vol. 73, November 7, February, 1927, article by Williams and Kemp, and *India Rubber Journal* for March, 1927, article by J. D. Fry).

and show no indications of doing so, whereas the dry samples are practically thoroughly dehydrated.

The same samples, after being weighed, were milled under wet and dry conditions. Table II shows the moisture gained or lost under this treatment. An examination of this table shows that samples which were conditioned in the wet cabinet lost weight upon milling, whether this milling was done wet or dry. Samples which were kept dry and milled wet gained, on the average, small amounts in weights. Those which were kept dry and milled dry lost very slight amounts.

TABLE II.—CHANGE IN MOISTURE CONTENT CAUSED BY MILLING[a] UNDER WET AND DRY CONDITIONS.
Values are expressed in grams change in weight of 500-g. samples.

	Exposure Period Before Milling			
	10 Days Dry	*20 Days Dry*	*10 Days Wet*	*20 Days Wet*
Hexa ....A Milled Wet	+0.50	+0.64	—0.95	—1.3
Hexa ....A Milled Dry	—0.08	—0.05	—0.14	—0.86
D.P.G....B Milled Wet	+0.17	—0.06	.....	—0.48
D.P.G....B Milled Dry	0.00	—0.02	—0.80	—0.45
Reclaim...C Milled Wet	+0 22	0.00	—0.55	—0.18
Reclaim...C Milled Dry	0.00	0.00	—0.55	—0.63

[a]Milling carried out at 70° C.

During the wet milling, steam was shot directly onto the rubber. It was so wet that drops of water were continually forming on the jet and dropping into the rolls. In spite of this the amounts of weight gained were astonishingly small in comparison with the amounts gained during the exposure periods, and at the same time are very large in comparison with the amounts gained under ordinary conditions. The temperature at which the rolls are working and therefore of the air next to the rolls is probably great enough to keep the relative humidity of the air which comes into contact with the rubber at a very low percentage. To express this thought quantitatively, air at 100 per cent relative humidity and atmospheric temperature will only have a relative humidity of about 7 to 12 per cent when heated to 70° C. in contact with the rubber on the mill; whereas, when water actually touches rubber the relative humidity is 100 per cent at that temperature. It is very probable, therefore, that all milling is comparatively dry, regardless of the relative humidity of the atmosphere at the time.

Assuming this to be a fact, our argument for making dryness the standard condition for testing is further substantiated. The rubber leaves the mill fairly dry and it is comparatively easy to keep a stock dry when it is already in that condition.

TABLE III.—THE EFFECT ON TENSILE PROPERTIES CAUSED BY DIFFERENT HUMIDITIES BEFORE AND DURING MILLING.
Stocks were all kept at the same (laboratory, about 50 per cent) relative humidity between curing and testing (24 hours).
Each value average of 5 tests.

Condition Before Milling	*Condition During Milling*	*Milling and Curing (24 hours)*	*Tensile Strength, lb. per sq. in.* 10 Days[a]	20 Days[a]	*Elongation, per cent* 10 Days	20 Days	*Stress at 300 per cent Elongation, lb. per sq. in.* 10 Days	20 Days	*Stress at 450 per cent Elongation, lb. per sq. in.* 10 Days	20 Days	*Slope,[b] lb. per sq. in.* 10 Days	20 Days
						Compound A						
Wet	Wet	Wet	3025	2790	530	500	1340	1300	2535	2485	1195	1185
Wet	Dry	Dry	3125	2860	540	515	1290	1275	2470	2435	1080	1160
Dry	Wet	Wet	3165	3085	545	530	1305	1315	2460	2505	1155	1190
Dry	Dry	Dry	3230	3140	540	550	1335	1290	2560	2420	1225	1130
						Compound B						
Wet	Wet	Wet	2805	2885	625	620	575	600	1350	1455	755	855
Wet	Dry	Dry	2985	3000	620	625	645	655	1500	1465	855	810
Dry	Wet	Wet	3195	3115	615	615	795	780	1725	1740	930	960
Dry	Dry	Dry	3225	3010	605	595	845	835	1830	1750	985	915
						Compound C						
Wet	Wet	Wet	1470	1420	420	400	1035	1075	....	....	....	....
Wet	Dry	Dry	1525	1495	410	400	1100	1125	....	....	....	....
Dry	Wet	Wet	1505	1470	400	385	1140	1165	....	....	....	....
Dry	Dry	Dry	1550	1490	410	390	1255	1155	....	....	....	....

[a]Exposure period before milling.
[b]Slope is the difference between stresses in pounds per square inch at 450-percent and 300-percent elongation.

These samples after wet and dry milling were cured and tested in accordance with the A.S.T.M. Standard Methods of Testing Rubber Products (D 15-24). Table III shows the effects of these treatments on tensile strength and stiffness.

All results given represent the averages of five tests. Table III shows that samples which were kept dry have a higher tensile strength than corresponding samples which were kept wet. It is further evident that wet milling has had a slightly deleterious effect on tensile strength, but in view of the fact that the rubber was in actual contact with water during milling this effect was exaggerated and it would probably be entirely negligible even in the case of saturated air. The elongations are practically the same for all corresponding mixes. All samples show a steady decrease in tensile strength as the conditioning periods are completed. That is, the 20-day samples are inferior to the 10-day samples, and these in turn are inferior to the original. This is true of both wet and dry samples.

It has long been recognized that stocks should stand for some time after milling, perhaps 24 hours to a week. These findings indicate that there is, at the same time, an aging effect that works in the opposite direction. Possibly the sulfur and accelerator have a deteriorating effect on goods if allowed to remain uncured for too long a time.

TABLE IV.—THE EFFECT ON TENSILE PROPERTIES CAUSED BY 0 PER CENT AND 100 PER CENT RELATIVE HUMIDITIES WITHOUT REMILLING.

Tensile Strength, lb. per sq. in. 10	20	30	*Elongation, per cent* 10	20	30	*Stress at 300 per cent Elongation, lb. per sq. in.* 10	20	30	*Stress at 450 per cent Elongation, lb. per sq. in.* 10	20	30	*Slope, lb. per sq. in.* 10	20	30
Days[a]			*Days*											
						Compound A—Wet†								
2810	2630	2720	550	615	560	1090	760	570	2315	1615	1915	1045	890	1345
						Compound A—Dry†								
3105	3090	3040	535	565	545	1215	950	1190	2425	1865	2300	1210	915	1110
						Compound B—Wet†								
3180	2975	2900	625	630	625	698	645	565	1485	1425	1275	787	780	710
						Compound B—Dry†								
3330	3180	3180	605	615	600	840	760	750	1825	1650	1680	985	890	930
						Compound C—Wet†								
1315	1220	*	385	380	*	1050	1005	*	....	....	....	....	....	....
						Compound C—Dry†								
1410	1420	1470	380	400	400	1110	1080	1090	....	....	....	....	....	....

[a]Exposure period before curing.
*Blistered.
†Exposure Before Curing.

Since samples kept dry and milled wet are higher in tensile strength and stiffness than corresponding samples kept wet and milled dry, it follows that exposure to different atmospheric humidities is a more important factor than wet and dry milling.

Stringfield found that if a stock were accelerated with Hexa, the slope would increase as the relative humidity before curing increased. The slope figures for the compound A given in Table III show this to be true, but only after the stock has been subjected to 100 per cent relative humidity for 20 days. He defines slope as the difference in stresses at 500-per-cent and 700-per-cent elongations and is dealing with almost pure gum stocks. We were forced to define slope as the difference in stresses at 300-per-cent and 450-per-cent elongations because our samples broke before reaching 700-per-cent elongation, and we are using rather heavily loaded mixes. Therefore, we believe that both results are entirely in line, one with the other.

In stocks accelerated with D.P.G., the factors which have obscured the conclusions for Hexa stocks seem to have made no difference whatever. For every increase in humidity there is a corresponding decrease in the slope figure, which is in exact accordance with Stringfield's work.

Since the humidity conditioning periods are found to be of more relative importance than the milling, samples of compounds A, B and C were placed in the dry and wet cabinets for 10, 20, and 30-day periods and then cured and tested without being milled again. The results are given in Table IV. The samples of compound C blistered so badly when exposed to a 100 per cent relative humidity for 30 days that accurate tests were impossible.

These data substantiate those given in Table III. The gradual lowering of the tensile strength of stocks exposed to high humidity is shown just as before, as well as the peculiar reversal of the slope figure for the Hexa mix which

was exposed for 30 days to 100 per cent relative humidity.

All of our results so far have shown that exposure to wet and dry conditions makes a difference in the quality of the stocks which have undergone such treatment. However, the work was carried out over periods of time and under conditions which are rarely, if ever, encountered in a laboratory. Simply because differences in tensile strength of 200 to 500 lb. per sq. in. were found in corresponding samples exposed for lengthy periods at 0 per cent and 100 per cent relative humidity, it does not necessarily follow that the amounts of change will be the same, or even proportional, when the work is done over periods of 24, 48, 72 and 144 hours and at relative humidities which vary by, perhaps, only 20 per cent. In order to find the differences which would result from relatively short periods of exposure and slightly varying humidities, uncured samples of compounds A, B and C were exposed for 24, 48, 72 and 144-hour periods at 0, 50, 80, and 100 per cent relative humidity. The results of these tests are given in Table V.

TABLE V.—EFFECT ON TENSILE PROPERTIES OF EXPOSURE OF UNCURED SAMPLES TO VARIOUS RELATIVE HUMIDITIES FOR SHORT LENGTHS OF TIME.

Exposure Period Before Curing, Hours[a]	Compound A				Compound B				Compound C			
	Relative Humidity, per cent											
	0	50	80	100	0	50	80	100	0	50	80	100
	Tensile Strength, lb. per sq. in.											
24	3060	3010	2980	3010	3280	2880	3200	3260	1520	1470	1500	1440
48	3060	2900	2900	2980	3340	2945	2980	3140	1550	1470	1390	1440
72	2840	2995	2980	2900	3080	3020	2940	2840	1590	1530	1540	1440
144	3040	3020	2950	2920	3160	3145	3040	2930	1345	1600	1485	1560
	Elongation, per cent											
24	520	515	520	545	595	580	605	630	400	390	395	385
48	535	540	520	545	610	595	600	610	395	405	390	380
72	505	550	520	530	600	600	605	620	410	415	405	425
144	555	565	560	565	...	615	630	640	415	445	425	430
	Stress at 300 per cent Elongation, lb. per sq. in.											
24	1240	1240	1240	1240	835	780	770	805	1150	1090	1110	1150
48	1180	1170	1130	1240	705	690	715	675	1060	1040	1080	1025
72	1120	1150	1170	1140	740	715	705	555	1110	1010	1020	1010
144	1210	1200	1170	1075	695	580	640	580	1000	1040	1035	1060
	Stress at 450 per cent Elongation, lb. per sq. in.											
24	2515	2400	2400	2400	1890	1780	1730	1800	....	....	....	....
48	2330	2340	2340	2340	1630	1640	1620	1570	....	....	....	....
72	2350	2270	2370	2250	1680	1660	1555	1330	....	....	....	....
144	2310	2290	2170	2110	1580	1585	1470	1320	....	....	....	....
	Slope, lb. per sq. in.											
24	1275	1160	1160	1160	055	1000	960	995	....	....	....	....
48	1150	1170	1210	1120	925	950	905	895	....	....	....	....
72	1230	1120	1200	1110	930	945	850	780	....	....	....	....
144	1100	1090	1000	1035	885	905	830	740	....	....	....	....

[a]Exposure period before curing.

When working in these relatively short-time exposure ranges the results are not quite so clear cut as in the longer periods of time. It is apparent, however, that even 24 hours will show the difference between 0 per cent and 100 per cent relative humidities. For humidity variations from 50 to 80 per cent, the time must be lengthened somewhat, but it begins to show in from 72 to 144 hours, although even the 144-hour period is not sufficient to show the reversal of slope in the Hexa stock.

All the data given in this paper so far refer to specimens which were exposed to various conditions before curing. In an earlier unpublished report, we had considered the effect of relative humidity on samples which were exposed after curing. As much of that report as is relevant to this subject will be included in this paper.

At that time we used only two stocks and made no attempt to correlate their behavior after curing with their history before curing. It is complete enough in itself to furnish us with conclusive data on the behavior or cured test slabs of these two compounds, subjected to various humidity conditions and for that reason is incorporated in this paper. These two stocks were:

	Compound E	Compound F
Pale Crepe	920	920
Sulfur	37	37
Hexa	28	9
XX Red Zinc Oxide	1035	224
Carbon Black	...	251
Stearic Acid	9	9

Compound E, Cured 1 hour at 40 lb., Compound F, Cured 2 hours at 40 lb.

Cured samples of these stocks were exposed for 10 and 20-day periods at 0, 50, and 100 per cent relative humidities. Table VI gives the changes in moisture content and Table VII, the effect upon tensile properties.

The tensile strength and stiffness decrease with increase in relative humidity. The samples of compound E show an increase for 20 days over the 10-day period, but this is probably a result of aging rather than humidity. The samples of compound F show a decrease.

TABLE VI.—CHANGE IN MOISTURE CONTENT CAUSED BY EXPOSING CURED SPECIMENS TO DIFFERENT RELATIVE HUMIDITIES.
Values are grams change in weight of 100-g. samples.

	Relative Humidity, per cent	10 days	20 days
Compound E	0	—0.19	—0.24
	50	—0.09	—0.07
	100	.....	+1.3
Compound F	0	—0.07	—0.02
	50	+0.14	+0.19
	100	+0.17	+0.87

TABLE VII.—EFFECT ON TENSILE PROPERTIES CAUSED BY EXPOSING CURED SAMPLES TO VARIOUS RELATIVE HUMIDITIES FOR DIFFERENT LENGTHS OF TIME.

	Exposure, Relative Humidity, per cent	Tensile Strength, lb. per sq. in.		Elongation, per cent		Stress at 300 Per Cent Elongation, lb. per sq. in.		Stress at 450 Per Cent Elongation, lb. per sq. in.		Scope, lb. per sq. in.	
		Days[a]		Days							
		10	20	10	20	10	20	10	20	10	20
Compound E	0	3625	3750	615	615	835	935	1775	2010	940	1075
	50	3510	3725	615	630	750	895	1645	1855	845	960
	100	3500	3590	645	620	645	675	1355	1630	710	955
Compound F	0	4405	4245	615	615	860	1025	2025	2325	1160	1300
	50	4205	3880	615	625	875	1045	2010	2355	1135	1310
	100	3995	3710	615	615	850	990	1880	2216	1030	1270

[a]Exposure period.

Conclusions and Recommendations

All of the facts so far learned point very definitely to the conclusion that varying amounts of moisture and lengthening periods of time cause corresponding changes in tensile strength and stiffness in any stock.

It is true that our usual laboratory runs last only three days and that, in general, over long periods of time (such as a year), the average humidity will vary only about 40 per cent, but it is also true that a few of our recures stand from 10 to 15 days and our master batches stand from 20 to 40 days. Furthermore, relative humidity may vary almost from 0 per cent to 100 per cent in a 24-hour period and remain at its new level for 3 or 4 days; quite long enough to make a very decided change in the stock exposed during that time.

From the data obtained in this series of tests, we have concluded:

1. Humidity control is desirable.

2. A constant humidity storage cabinet is sufficient for vulcanized samples. Time of exposure is the major factor and consequently a constant humidity room for testing is not necessary because of the short time that the test specimens are exposed.

3. Since moisture changes have a very large influence on unvulcanized stocks before and after milling, a humidity controlled cabinet should be used for the storage of these stocks.

4. No control of humidity conditions is necessary during milling. Moisture is usually given off during this process at the temperature (70° C.) which is ordinarily used in our laboratory.

5. We recommend a low relative humidity as the best working condition and have chosen 0 per cent because:

(*a*) It is the easiest to maintain;

(*b*) Under this condition the total moisture content is low and therefore changes in moisture content are reduced to a minimum;

(*c*) When higher humidities are used changes in moisture content of some stocks are much more rapid than in others, and consequently, comparative results which presuppose all conditions to be equal, are an impossibility;

(*d*) Uncured stocks, especially reclaim, kept at a high[1]

[1]Van Iterson, *India Rubber Journal*, 1918, Vol. IV, p. 423.

[*Concluded on Page* 406]

Rubber Consumption Has Set New Six Months Record

More Rubber Was Used in First Half of 1927 Than in Any Previous Similar Period, and Estimates of Demand in Last Half of the Year Are Now in Order

CRUDE RUBBER consumption in the United States has been maintained at such a suprisingly high rate during the first half of 1927 that it appears certain a new record will be set or that a total of almost 400,000 tons may be rolled up.

At the beginning of the year there was much talk that no more than 360,000 tons of new rubber would be needed by the United States in 1927. Those who thought that consumption would run as high as 385,000 tons or thereabouts were regarded as entirely too optimistic. The observers who felt that 1927 consumption could not do more than equal that of 1926 (360,000 tons) were influenced by the persistent conservatism of tire buyers throughout 1926 and the increasing use of reclaimed rubber. They had not counted, however, on the degree to which motorists, stimulated by lower tire prices, would buy new tires in the current year, and on such a growth in demand for rubber goods that the continued large consumption of reclaimed would be largely nullified.

New Six Months Record

During the first six months of 1927 the United States has used 202,060 long tons of rubber, a record for such a period. The first half of 1925 was the nearest to this record; in that half-year slightly more than 198,000 tons of rubber were used and prices shot upward since stocks were low.

Large consumption in the present year did not begin until March. January and February were not unusual, the consumption in each case falling below the corresponding month of last year. However, in March there were 36,141 tons consumed which came within a few tons of setting a monthly record for all time. Only a little less, or 35,871 tons, to be exact, were used in April and since that time the stepping down from the peak has been only gradual, as follows: May 34,592 tons, and June, 33,801 tons. All of these figures are the Rubber Association of America monthly compilations, *raised to 100 per cent.*

In the present month tire production has been curtailed somewhat but rubber consumption is expected to run to at least 32,000 tons. If a monthly average of 32,000 tons were maintained during the last six months of the year, the total 1927 consumption would be 394,000 tons or more than has been used in the United States in any year so far. An average of 31,000 tons would mean a 1927 consumption of 388,000 tons, while an average of 30,000 tons would mean a total for the year of 382,000 tons.

The consumption of rubber, by months, since 1921 is shown on page 417 in the statistical section of this issue and accordingly no similar table will be reproduced here. It may be recalled, however, that the largest consumption in history was that of 1925 when 388,481 tons were used, according to the Rubber Association's monthly figures. If, as seen above, the monthly consumption during the last half of this year should average 31,000 tons, the total consumption in 1927 would be almost exactly the same as the total consumption in 1925. The price situation would likely be much different, however, since the stocks at the present moment are much more ample than they were in 1925 when soaring consumption sent the price to more than $1.20 per pound.

But will the consumption in the remaining months of 1927 average 31,000 tons? Many people think that it will. The average monthly consumption during the last half of 1925 was 31,717 tons. In the last half of 1926, a much slower year, it was 29,870 tons.

Guessing the course rubber consumption will take in the last half of 1927 is now a general sport in rubber circles, but it is a most serious one since a considerable slump in demand would undoubtedly send the already weak market down to much low prices. Another decline such as occurred in June would apparently be inevitable for there does not appear to be the slightest nervousness about supplies and prices are being maintained on day-to-day demand. The favorite estimate seems to be that consumption in the last half of the year will average 31,000 tons per month. More than 31,000 tons will probably be used in July but November and December will set records if they call for more than 29,000 tons.

Foreign Consumption Also High

Outside the United States rubber consumption appears to have been progressing also at an unusually high rate. Other rubber consuming countries had net imports of practically 90,000 tons of rubber in the first four months of 1927, later statistics not being available. Stocks in these countries, insofar as information is available, appear to have increased 19,000 tons, leaving 71,000 tons retained for consumption in the one-third of the year. This is at the rate of 213,000 tons in the year. The most optimistic estimates early this year were around 200,000 tons. A more common estimate was 180,000 or 185,000 tons. In 1926 the rubber consumed outside the United States amounted to about 170,000 tons. It is probable that consumption in foreign countries will fall off in the latter months of the year, just as it does in the United States, so that the tonnage used during the year will not exceed 200,000 tons, but more likely fall slightly below that figure.

If the United States should have a 1927 consumption of 388,000 tons and foreign countries should account for an additional 200,000 tons, the world demand in the year would be 588,000 tons or considerably above the total requirements in any previous year. Some of the more optimistic estimates covering the present year

[Continued on Page 406]

The Expanding Use of Rubber In Engineering

Continued Investigation of the Natural and Varied Properties of Rubber Reveals New Ways in Which It Can Be Used In Engineering

RUBBER HAS so many distinctive properties that its full application in engineering is being only slowly achieved. The ability of rubber to resist abrasion has been taken advantage of in a number of well-known ways. Its high frictional resistance to dry surfaces and its low frictional resistance to wet surfaces is likewise familiar. These last named properties are responsible for the success of rubber transmission belting, on the one hand, and rubber bearings and sealing sleeves on the other. These uses have been described and are rather well understood.

Other properties of rubber, perhaps less appreciated, are being used more and more to solve engineering problems. Some of these were described by J. W. Schade in a recent address before the American Institute of Chemical Engineers, from which the following paragraphs were taken. The ways in which these properties have been applied by engineers are also indicated.

An important property of rubber is absorption of energy and elimination of noise, Mr. Schade said. Rubber is practically incompressible. When in an experiment rubber was compressed in a plunger mold the steel yielded before there was any measureable volume reduction of the rubber, even with steel having a yield point of 100,000 pounds per square inch. The absorption of energy, therefore, when pressure is applied on a mass of rubber occurs through stretching of the mass, usually at right angles to the direction of application of the force. The ability of rubber to store up energy on deformation is more than one hundred times that of spring steel. Rubber mallets, cushions for steam hammers, rubber shackles for heavy trucks, shock absorber cord for airplanes, rubber table tops on which fragile materials are handled, supports under machinery, vehicle tires of various kinds and sizes, street pavements, flooring, and other diversified applications have been made. Rubber shackles on heavy automobile trucks have been in use for some years, successfully absorbing shocks, eliminating noise and lubrication difficulties. For cushioning purposes sponge rubber is effective in special cases. Rubber blocks have been used inside dies for punching metal to eject the punched pieces.

Tensile Strength Depends on Composition

Concerning other properties of rubber it is sufficient to mention that the tensile strength of rubber compounds varies widely according to composition from a few hundred pounds to about four thousand pounds per square inch and in a few instances even higher. The elongation of rubber strips at the breaking point may run as high as 900 per cent of the original length in stocks without pigment and will vary more or less widely from this figure depending on the kind and quantity of materials compounded with the crude rubber.

The dielectric properties of rubber are well known and many commercial applications of rubber as an electrical insulator have been made. It has been found possible, peculiarly enough, to alter the electrical properties by compounding so as to actually make rubber compounds conductors of electricity. Although this has as yet no important commercial use, it illustrates once more the wide variety of properties it is possible to obtain by intelligent compounding.

The resistance of rubber to water has been known as long as the material itself. Even before vulcanization of caoutchouc was discovered rubber was used for water-proofing. Recently an interesting application has been made taking advantage of the resistance to water, together with the low heat conductivity of rubber, in using rubber-lined pipe to conduct hot water in the rayon industry. Non-corrosive metal pipe could be used but the heat losses in unlagged pipe would be very large compared to those obtaining in rubber-lined pipe.

Rubber Compounded to Withstand Steam

Resistance to the action of steam can be secured by proper compounding. Car heating hose has made possible convenient coupling of the heating units of passenger cars to one another and to the locomotive. Steam pressures up to one hundred pounds will not deteriorate these rubber structures rapidly. Combined with asbestos, rubber is used as packing for steam lines carrying superheated steam up to 600° F. Resistance of rubber to diffusion of gases has been utilized in pneumatic tires, dirigible and free balloons, air hose, and in other ways.

What is probably the most recent, and to chemical engineers the most interesting application of rubber, is the design of apparatus covered with rubber to resist alkalies, acids and solvents of various kinds. It has long been proverbial that oil deteriorates rubber quickly and seriously. This idea has not, however, deterred the rubber technologist from attempting the seemingly impossible and as a result he has produced a paradox. Retaining the flexibility of rubber, he has added oil-resisting properties so that many commercial applications are now made of oil-resisting rubber. Oil companies use rubber hose for conveying a variety of petroleum products at the loading dock or from tank to wagon or from wagon to dwelling-house. Air hose for pneumatic tools is made oil-resisting so that the lubricant for the tools may pass through it with the air. Oil paints are sprayed through rubber hose. Milk fat does not rapidly deteriorate the rubber of dairy or creamery hose.

Probably the most extensive commercial application of oil-resisting rubber is in the form of inking rolls on printing presses. Gelatine rolls last less than a year and the effect of temperature on their hardness is such that it is necessary to use rolls of different compositions winter and summer. Not only do rubber rolls operate without change the year round, but they give better

definition in the printed matter, especially on color work. Rubber rolls have been in continuous service for eight years and give no indication of needing replacement soon.

Rubber serves two other printing processes. Offset blankets taking the ink from zinc plates have largely replaced the older lithographing process. The speed of operation is trebled by the use of offset blankets. The other adjunct to printing is the use of rubber engraving gum in which special designs may be cut in relief and the "type" thus formed used in printing material which is not perfectly smooth, such as cloth bags, wooden boxes, or metal signs. Gasoline, another powerful solvent for rubber, is handled at filling stations through rubber hose. In the accompanying table there are listed various solutions to which a grade of rubber designed for general chemical service has already shown satisfactory resistance.

CHEMICAL AGENTS RESISTED BY RUBBER

	Concentration by Weight	Maximum Temperature °F.
Liquid Acids		
Hydrobromic	Any concentration	100
Hydrofluoric	Any concentration	150
Hydrofluosilicic	Any concentration	150
Muriatic (hydrochloric)	Any concentration	150
Phosphoric	Up to 75 per cent	125
Sulphuric	Up to 50 per cent	150
Carbonic	Any concentration	150
Pyroligneous	Any concentration	150
Sulphurus	Any concentration	150
Solutions		
Caustic soda and potash	Up to saturation	150
Calcium chloride	Up to saturation	150
Calcium hypochlorite	Up to saturation	100
Copper sulphate	Up to saturation	150
Sodium acid sulphate	Up to saturation	150
Milk of lime	Any concentration	125
Zinc chloride	Up to 50 per cent	100
Aqua ammonia	Any concentration	125
Ferrous sulphate	Up to saturation	150
Sodium chloride	Up to saturation	150
Zinc sulphate	Up to saturation	150
Aluminum sulphate (alum)	Up to saturation	150
Organic Liquids		
Acetone	—	130
Ethanol	Any concentration	140
Methanol	Any concentration	150

This list discloses a rather broad field for applying rubber to chemical apparatus. Admittedly, there are serious limitations. Nitric acid, for example, deteriorates rubber rapidly, and there are other peculiar failures of rubber to resist chemical agents. In the rather broad field already existing some ingenious applications have, however, been made. Steel tank cars of eight thousand gallon capacity have been lined with vulcanized rubber and have already been used for nearly three years for transporting hydrochloric or phosphoric acid without any evidence of deterioration of the rubber or loosening of the rubber from the steel.

This development for transportation is a vast improvement over the older method used for many years of lining wooden tanks with unvulcanized rubber. The older process is still useful for stationary tanks but now, if desirable, even in such cars the rubber may be vulcanized after application of the lining to the tanks in their permanent location. These wooden tanks, nevertheless, are threatened with replacement by steel, rubber-lined tanks. A number of the latter are already in service in a chemical process involving the use of hydrochloric acid at temperatures up to 180° F. and operating at times under vacuum of twenty-six inches. Concrete tanks, also, have been successfully lined or covered both inside and outside with rubber.

It was soon realized that rubber-lined tanks in a chemical plant needed rubber-lined pipe for filling or emptying and rubber-lined valves for checking the flow of liquid. To meet these needs both rubber-lined pipe and rubber-lined (quickly relinable) valves have been designed and put on the market. The pipe is flanged and covered with rubber on the flanges as well as inside so that when the pipes are coupled rubber only is exposed to the liquid throughout the system. One doubting-Thomas made an interesting test of the mechanical strength of a rubber valve. He opened and closed the valve every twenty minutes for more than sixty working days, making a total of two thousand compressions on the rubber. There was no cracking and no wear discernible after this treatment and he is now using rubber valves with confidence. With this variety of rubber-lined auxiliary apparatus it is also possible to use rubber-lined tanks as blow cases.

[1]See The Rubber Age, Vol. 20 (1926), pages 447 and 555.
[2]Ind. Eng. Chem., 13, 118—(1921).

Influence of Moisture on Testing

(Continued from Page 403)

humidity for too long a time, tend to develop porosity upon vulcanization.

6. Even though temperature and humidity controls are adopted for the testing laboratory, a schedule for routing the samples through the laboratory in a definite time period is desirable to prevent non-uniformity through physical and chemical aging effect.

As a first step toward the control of humidity, we are installing two dry storage cabinets, one for crude rubber and master batches and the other for cured test slabs. Later, after we have proved the value of this installation, we intend to build a larger dry cabinet to store the stocks between milling and vulcanization.

Preliminary work has shown that moisture has an affect upon the abrasive qualities of tire treads. In the future this work will be amplified and the effect of moisture upon the heating up of solid tires in service will be investigated.

We have recommended a dry condition for control testing. There will be research programs in which it will probably be desirable to approximate the humidity conditions of service. In such a case the vulcanized samples could be stored at different humidities, a low humidity, for example, to approximate Arizona weather, and a high humidity to approximate the moisture conditions in damp sections of the country.

Rubber Consumption Sets Record

(*Continued from Page* 404)

were to the effect that 605,000 tons would be needed, but such a figure is obviously too high although consumption has been at a surprisingly high rate in the first half-year.

In view of the amount by which the consumption of rubber has surpassed expectations, the weakness of the rubber market might be somewhat surprising. It is a fact, however, that the rather comfortable stocks of rubber which were built up when the British colonies were able to export all or almost all of their production have given consumers the idea that they have nothing to worry about in connection with their supplies.

While stocks are comfortably large and well-maintained, they cannot be construed as excessive and might be subject to rapid depletion if the British restriction act were really tightened up again as some feel that it will be. Stocks on hand and afloat are computed to amount to about 250,000 tons, which is only a five months' supply at the rate of 600,000 tons per annum. Five months' supply is certainly not excessive when stocks afloat are included.

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LATE MARKET PRICES

Crude, Scrap & Reclaimed Rubber • Cottons and Fabrics

JULY 18, 1927

COTTON

SPOT PRICES for middling upland cotton have risen in the past two weeks from a 17-cent level to 18.30c on July 18. This is the highest price for spot cotton so far this year. This upward revision was largely due to the report by the Government that the decrease in planted area for this year would be 12.4%. Spot prices rose 20 points, up to 17.35c on July 9 when the Government report was made public. It was generally believed that the acreage reduction would not be greater than 10% so that the report was a complete surprise, and sent most months up 30 to 35 points. Late prices follow:

	High	Low	July 18 Close	July 2 Close
July	17.85	17.70	17.80	16.90
October	18.29	18.09	18.20	17.15
December	18.55	18.35	18.46	17.36
Jan.	18.62	18.43	18.55	17.41

Tire Fabrics

At the present time there is little business reported in tire fabric. Tire companies are said to be carrying more than usual inventories for the period of the year, but hope to materially decrease the quantities now that hot weather is inducing automobile owners to make greater use of their cars. Consumption of cotton fabric during May was 16,028,546 pounds. Recent prices follow:

CORD			
Peeler, carded, 25/5/3	lb.	.42 @	.44
Peeler, carded, 23/4/3	lb.	.43 @	.44
Peeler, carded, 13/3/3	lb.	.40 @	.41
Peeler, carded, 15/3/3	lb.	.41 @	.42
Egyptian, carded, 23/5/3	lb.	.54 @	.57
Egyptian, combed, 23/5/3	lb.	.56 @	.61
CHAFERS			
Carded American, 8 oz.	lb.	.38 @	.39
Carded American, 10 oz.	lb.	.42 @	.44
Carded American, 12 oz.	lb.	.40 @	.42½
Carded American, 14 oz.	lb.	.39 @	.42½
LENO BREAKER			
Carded American, 8¼ oz.	lb.	.37½ @	.40
Carded American, 10¼ oz.	lb.	.37½ @	.40
SQUARE WOVEN			
Carded American, 17¼ oz. 13-11 ply	lb.	.42 @	.43
Carded American, 17¼ oz. 10-5 ply	lb.	.37 @	.39

Sheetings

Little activity has been reported in sheetings, small lots receiving most of the business. Trading on 40-inch, 3.75-yard brought from 8⅝c net to 8¼c net; 40-inch 2.50-yard, 11½c net; 40-inch 2.85 yard, 10¼c net. Advance orders are still being filled. Late prices follow:

40-inch 2.50-yard	yd.	.11 @	.11½
40-inch 2.85-yard	yd.	.10 @	.10¼
40-inch 3.15-yard	yd.	.10⅝ @	.11½
40-inch 3.60-yard	yd.	.09¼ @	.10
40-inch 3.75-yard	yd.	.08¾ @	.08¼
40-inch 4.25-yard	yd.	.07¼ @	.07½

Ducks

A number of moderate sized inquiries have been received in the cotton duck section recently, but they failed to materialize in business because buyers found that mills would not quote down to levels acceptable. A number of contracts were placed for single filling duck at prices between 13½c and 14½c. The grades sold were A and B which held for higher prices in various quarters. Prices follow:

Belting and Hose	lb.	.34 @	.35
Enameling	lb.	.32 @	.36
Sloe Ducks	lb.	.29½ @	.33½
Single filling	lb.	.13 @	.16
Double filling	lb.	.15½ @	.17

RECLAIMED RUBBER

Demand for reclaims has been spotty and irregular and reclaimers are not working at capacity. Keen competition has forced down a number of standard grades and prices quoted now offer buyers the lowest levels in many months. Latest quotations follow:

High Tensile			
Super-Reclaim No. 1 Black	lb.	.15½ @	.16½
Super-Reclaim No. 2 Black	lb.	.13½ @	.14
High Tensile Red		.15 @	.15½
Shoe			
Unwashed	lb.	.08 @	.08¼
Washed	lb.	.10¾ @	.11
Tube			
No. 1. (Floating)	lb.	.17½ @	.18½
No. 2. (Compounded)	lb.	.13 @	.13½
Tires			
Black, washed		.10 @	.10¼
Black, unwashed		.08¼ @	.08½
Black selected tires	lb.	.08¾ @	.09
Dark Gray	lb.	.12¾ @	.13¼
Light Gray	lb.	.13½ @	.14
White	lb.	.15½ @	.16
Truck, Heavy Gravity	lb.	.08 @	.08½
" Light Gravity	lb.	.09 @	.09½
Miscellaneous			
Mechanical Blends	lb.	.08 @	.08½
Red	lb.	.15 @	.15½

SCRAP RUBBER

Scrap dealers report very little interest in supplies by reclaimers and almost no desire on the part of small dealers to release stocks at prevailing low quotations. This has resulted in a lack of stocks in some quarters but this condition is expected to be relieved when it is realized that higher prices are not forthcoming. Quotations are unchanged.

[Prices to Consumer]

Auto tire peelings	ton	32.00 @	34.00
Standard White auto	ton	50.00 @	52.00
Mixed auto	ton	25.00 @	26.00
Bicycle tires	ton	24.00 @	25.00
Clean solid truck tires	ton	28.00 @	30.00
Boots and shoes	lb.	.01¾ @	.01⅞
Arctics, trimmed	lb.	.01¼ @	.01⅜
Arctics, untrimmed	lb.	.00⅞ @	.01
Inner tubes, No. 1	lb.	.07 @	.07¼
Inner tubes, No. 2. compounded	lb.	.05¼ @	.05½
Inner Tubes, Red	lb.	.06¼ @	.06½
Air Brake Hose	ton	28.00 @	30.00
Rubber Hose	ton	15.00 @	16.00

CRUDE RUBBER

COINCIDENT WITH reductions in prices of crude rubber on the Exchange, the outside market also sagged on July 12 from 10 to 30 points, but in consequence, was more active. The market softened for a while in the afternoon, but steadied late in the day and closed unchanged on the spot to August deliveries of standard grades and ⅛c lower on the arrivals beyond. October-November-December deliveries were a shade higher on the 15th. The hot weather served to increase tire demand over the country and prices gained on the 16th and 18th.

Plantations—			
Ribbed Smoked Sheets			
Spot	.35⅛ @	.35⅜	
July	.35⅛ @	.35⅜	
August	.35⅛ @	.35⅜	
September	.35¼ @	.35½	
October/December	.35¼ @	.35¾	
January/March	.36⅛ @	.36½	
First Latex, crepe spot	.35 @	.35¾	
Amber Crepe, No. 2, spot	— @	.32¼	
" " No. 3	.31½ @	.31¾	
" " No. 4	— @	.31¼	
Brown Crepe, Rolled	.28½ @	.28¾	
" " Clean, thin	.31¾ @	.32	
" " Specky	.31½ @	.32¼	
Liquid Latex, per gal.	1.50 @	1.75	
" " Specky	.31 @	—	
Pontianac—			
Bangermassin	Nominal		
Palembang	Nominal		
Prime Pressed	Nominal		
Sarawak	Nominal		
Paras—			
Up-river Fine	.30 @	.30½	
" Medium	.29 @	—	
" Coarse	.19½ @	.20	
Acre Bolivian, fine	.30½ @	.31	
Tapajos, fine	.39 @	—	
Cut Beni Bolivian, fine	.45 @	—	
Caucho Ball—			
Upper, shipment	.20½ @	.21	
Upper shipment	.20 @	.20½	
Centrals—			
Corinto, scrap	.27 @	—	
Esmeraldo, sausage	.19 @	.19½	
Guayule, washed and dry	— @	.28	
Africans—			
Benguela, No. 2	Nominal		
Congo, upper, black	Nominal		
" " red	Nominal		
Balata—			
Block, Columbia	.35½ @	.38	
" Cuidad	.34½ @	.35	
Gutta Percha—			
Siak	.24 @	—	
Red Macassar	3.00 @	—	

LONDON MARKET

Standard Ribbed Smoked Sheets—*Buyers*		
Spot	16⅞d @	17d
July	16⅞d @	17d
August/September	17d @	17⅛d
Oct./Dec.	17¼ @	17⅜
Jan./March	17¾ @	18

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—*Sellers*		
Spot	16⅝ @	—
July	16⅜ @	—

Recent daily closing prices on the Rubber Exchange of New York are shown on the Financial Page in the News Section of this issue. Daily spot prices of Ribbed Smoked Sheets are given in the Statistical Section.

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1900 RUBBER FACTICE OF HIGHEST QUALITY THE STAMFORD FACTICE STAMFORD CONN THE STAMFORD RUBBER SUPPLY CO 1927

The Stamford Rubber Supply Company
Stamford, Conn.

Rubber Chemical Market Remains Quiet

July Movement of Compounding Materials Continues at Low Levels With Little Change Expected in August — Factory Operations Reported on Decrease.

NEW YORK, July 19, 1927—The inactivity of the market for rubber chemicals, accelerators and compounding materials reported in our last issue has continued past the middle of the month and reports obtained from leading factors in the industry indicate that not much improvement is expected for about six weeks, or until after Labor Day. This tendency towards lower shipments is by no means general, however. Several manufacturers reported excellent business for the first two weeks in July but admitted that it was unexpected and would hardly extend over any considerable period. September is the month generally predicted for the resumption of full time production. Prices have been firm with only a few changes made. Several of the accelerators are lower but crimson antimony is quoted slightly higher. Quotations follow:

ACCELERATORS

Organic

A-7	lb	.70 @	.80
A-11	lb.	.75 @	.90
A-16	lb.	.65 @	.85
A-13	lb.	.75 @	.90
Aldehyde ammonia, crystals	lb.	.65 @	.70
Aniline oil, drums	lb.	.17 @	.17½
"BB"	lb.	— @	—
Captax	lb.	— @	—
Crylene	lb.	.70 @	—
paste	lb.	.50 @	—
Di-Ortho-Tolylguanidine	lb.	.85 @	.90
Diphenylguanidine	lb.	.68 @	.72
Ethylidene aniline	lb.	.60 @	.65
Excellerex	lb.	.35 @	.40
Formaldehyde Aniline	lb.	.38 @	.42
Grasselerator 102	lb.	.65 @	.70
Grasselerator 552	lb.	4.80 @	5.00
Grasselerator 808	lb.	1.15 @	1.35
Heptene	lb.	.55 @	—
Hexamethylene-tetramine	lb.	.65 @	.70
Lithex	lb.	.18 @	.20
Monex	lb.	3.25 @	—
Paraphenylenediamine	lb.	1.25 @	1.30
Piperidine-Piperidyldithio-Carbamate	lb.	4.80 @	5.00
Quinoidine	lb.	.40 @	—
R & H 40	lb.	.50 @	.55
R & H 50	lb.	.50 @	.55
Super-Sulphur No. 1	lb.	— @	—
Super-Sulphur No. 2	lb.	— @	—
Tensilac, No. 41	lb.	.65 @	.70
Thiocarbanilide, kegs	lb.	.23 @	.26
Trimene	lb.	.75 @	—
base	lb.	1.20 @	1.35
Triphenylguanidine	lb.	.65 @	.70
Tuads	lb.	— @	—
Vulcone	lb.	.70 @	.74
Z. 88	lb.	.75 @	1.00
Z.B.X.	lb.	2.50 @	—
Zimate	lb.	— @	—

Inorganic

Lead, sublimed blue	lb.	.08¼ @	.08¾
Lead, white	lb.	.08¼ @	.08¾
Litharge, domestic	lb.	.09 @	.09½
Magnesia, calcined, light	lb.	.06 @	.12
heavy	lb.	.04 @	.04½

COLORS

***Blacks* (See Compounding Materials)**

Blues

Prussian	lb.	.33 @	.35
Ultramarine	lb.	.08 @	.35

Browns

Siena, Italian	lb.	.04½ @	.08
Umber, Turkey	lb.	.04½ @	.06

Greens

Chrome, light	lb.	.27 @	.31
medium	lb.	.29 @	.32
dark	lb.	.31 @	.34
Chromium Oxide, bbl.	lb.	.28 @	.32

Reds

Antimony crimson, 15/17	lb.	.40 @	—
sulphur free	lb.	.50 @	.52
golden 15/17 F.S.	lb.	.16 @	.22
Indian English (dom.)	lb.	.08 @	.10
Oximony	lb.	.13¼ @	—
Para toner	lb.	.13 @	.14
Red oxide, reduced	lb.	.10 @	.11
pure	lb.	.14 @	.15
Toluidine toner	lb.	1.75 @	1.85
Venetian red	lb.	.02 @	.06
Vermillion, quicksilver, English	lb.	1.55 @	1.65

Whites

Lithopone, Akrolith	lb.	.05¾ @	.06
Lithopone, Azolith	lb.	.05¼ @	.05¾
Lithopone, Vanolith	lb.	.10½ @	—
Titanox	lb.	.12 @	.12½
Calc. Base Pigment	lb.	.10½ @	.11
Zinc Oxide—American Process American Azo ZZZ (lead free)	lb.	.06½ @	.07
ZZ (under 5% leaded	lb.	.06⅜ @	.07⅛
Zinc Oxide—French Process White seal	lb.	.11⅞ @	—
Green seal	lb.	.10⅞ @	—
Red seal	lb.	.09⅞ @	—

Yellows

Chrome	lb.	.17 @	.20
Ocher, French medium	lb.	.03 @	.03¼
domestic	lb.	.01⅝ @	.02

COMPOUNDING MATERIALS

Aluminum Flake (f.o.b. plant)	ton	21.85 @	24.50
Hydrate light	lb.	.16½ @	.17
Ammonia carbonate	lb.	.13½ @	.14
Are-O-Sol	ton	8.00 @	11.00
Asbestine	ton	14.75 @	18.00
Barium carbonate	lb.	.02¼ @	.04
Barium Dust	lb.	.05 @	.06
Barytes southern off-color,	ton	12.00 @	18.00
Western prime white	ton	23.00 @	—
imported	ton	27.00 @	36.00
Basofor	lb.	.04½ @	—
Blacks Arrow "Aerfloted"	lb.	.08 @	.12
Bone Black	lb.	.05½ @	.11
Carbon, compressed	lb.	.07½ @	.11½
" uncompressed	lb.	.07 @	.11
Drop Black	lb.	.06 @	.10
Lamp "	lb.	.12 @	.40
Micronex	lb.	.08 @	.12
Thermatomic carbon	lb.	— @	—
Velvetex carbon	lb.	.04 @	.07
Blanc fixe dry f.o.b. works	lb.	.04 @	—
Carrara filler	lb.	.01¾ @	.02
Catalpo (fact.)	lb.	.02 @	—
Chalk	lb.	.02½ @	.04½
Clay, China, domestic	ton	8.00 @	9.00
Aerfloted Suprex	ton	9.00 @	20.00
Blue Ridge, Dark	ton	— @	—
" " Light	ton	— @	—
Dixie	ton	— @	—
Langford	ton	— @	—
Mineral Flour, c. l. fob mine	ton	20.00 @	23.00
Tensulite		15.00 @	—
Glues, extra white	lb.	.20 @	.29
medium white	lb.	.19 @	.25
common bone	lb.	.14 @	.15
Graphite flake, bbls.	lb.	.06½ @	.10
Magnesia, carbonate	lb.	.07½ @	.10
Mica, powdered	ton	90.00 @	100.00
Rotten Stone (powdered)	lb.	.02½ @	.04½
Soapstone, powdered	ton	15.00 @	22.00
Starch, powdered	cwt.	3.30 @	3.70
Talc, domestic	ton	16.00 @	18.00
Terra Alba	cwt.	1.15 @	1.75
Tripoli, white	lb.	.01¾ @	.02
Whiting, commercial	cwt.	.85 @	1.00
English cliffstone	cwt.	1.50 @	—
Quaker	ton	— @	—
Superfine	ton	10.00 @	12.00
Sussex	ton	— @	—
Vansulite	ton	12.50 @	—
Wood pulp XXX	ton	45.00 @	—
" " X	ton	25.00 @	—
Zinc Carbonate	lb.	.10 @	.12

MINERAL RUBBER

Genasco (factory)	ton	50.00 @	52.00
Granulated M.R.	ton	— @	—
Hydrocarbon, Hard	ton	— @	—
Hydrocarbon, Soft	ton	— @	—
320/340 M.P. hydrocarbon (c. l. factory)	ton	47.00 @	52.00
300/310 M.P. hydrocarbon (c. l. factory)	ton	42.00 @	47.00
Paradura	ton	62.50 @	65.00
Pioneer, MR, solid	ton	41.00 @	43.00
" —granulated	ton	51.00 @	53.00
Robertson, MR, solid	ton	34.00 @	80.00
M.R. (gran)	ton	34.00 @	80.00

SOFTENERS

Acids

Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulphuric, 60 degrees	ton	10.50 @	11.50
66 degrees	ton	15..00 @	16.00
Tartaric, crystals	lb.	.31½ @	—

Acids, Fatty

Stearex	lb.	.10 @	.14
Stearic, single pressed	lb.	.10 @	.11
double pressed	lb.	.11½ @	.12
triple pressed	lb.	.13½ @	.14

Alkalies

Caustic soda, 76%	cwt.	3.76 @	3.91
Soda ash, 58% C.L.	cwt.	1.42½ @	1.45

Oils

Castor, No. 3 bbls	lb.	.13¾ @	.14
Corn, crude, bbls.	lb.	.09¾ @	.10
refined	lb.	.11 @	—
Cottonseed, crude		.08 @	—
Cycline	gal.	.27 @	.34
Dispersol A (light)	lb.	.15 @	.16
" B (dark)	lb.	.14 @	.15
Fluxrite	lb.	.05 @	.06
Glycerine, C.P. drums	lb.	.26 @	.26½
Linseed, RawC.L. bbl.	lb.	.09½ @	.10
Palm Lagos	lb.	.08½ @	—
Niger	lb.	.07½ @	—
Vansulol	lb.	.10½ @	—
Peanut,domestic,crude	lb.	.11 @	—
Petrolatum, white	lb.	.08⅞ @	.09
amber	lb.	.03¾ @	.04
dark amber	lb.	.03⅜ @	.03½
Pine, steam distilled	lb.	.70 @	—
Rapeseed, refined	gal.	.82 @	.83
Rosin, first rectified	gal.	.70 @	—
second rectified	gal.	.73 @	—

Resins and Pitches

Pitch, Burgundy	lb.	.06½ @	.07½
coal tar	gal.	.05½ @	.06
pine	bbl.	9.00 @	10.00
Rosin, grade K	bbl.	11.40 @	—
Pigmentar	gal.	.33 @	.41
Tackol	lb.	.09 @	.15
Tar Retort	bbl.	15.50 @	16.00
kiln burned	bbl.	16.00 @	16.50

Solvents

Acetone, pure	lb.	.14½ @	—
Alcohol denatured, No. 1 bbls.	gal.	.37½ @	.44½
Benzol, 90%	gal.	.28 @	—
pure		.29 @	—
Carbon bisulphide	lb.	.05½ @	.06¼
Carbon tetrachloride		.06¾ @	.07½
Motor gasoline, steel bbls.	gal.	.20 @	—
Naptha, V. M. & P.	gal.	.14 @	—
Turpentine, spirits	gal.	.78 @	.79
wood	gal.	.73 @	.78

Waxes

Beeswax	lb.	.58 @	.60
Carnauba, No. 1	lb.	.57 @	.59
Ceresin, white	lb.	.13 @	.14
Montan, crude	lb.	.07 @	.07½
Ozokerite, black	lb.	.30 @	—
green	lb.	.30 @	.32

Miscellaneous

RSL Mold Solution	gal.	.75 @	1.00

ANTI-OXIDANTS

Age-Rite	lb.	— @	—
Antox	lb.	.81 @	.83
VGB	lb.	.55 @	.66

SUBSTITUTES

Black	lb.	.08 @	.14
White	lb.	.10 @	.16
Brown	lb.	.10 @	.15

VULCANIZING INGREDIENTS

Sulphur Chloride (drums)	lb.	.03½ @	.06
Sulphur flour Superfine, bags	cwt.	2.20 @	2.80
" bbls.	cwt.	2.55 @	3.10
100% pure, refined, bags	cwt.	2.60 @	3.15
bbls.	cwt.	2.95 @	3.50
Vandex	lb.	— @	—

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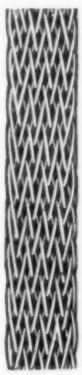

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Grasselerator 552
Grasselerator 808
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Not only has the rapidly increasing number of advertisers in this section necessitated the addition of an extra page each issue, but the new arrangement of placing each listing in its proper classification will make THE MARKET PLACE of greater usefulness to our readers and advertisers.

THE MARKET PLACE Section Continued on Next Page

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Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials [continued]

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SPECIAL MACHINERY
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A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

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Machinery and Equipment (continued)

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Stedman Products Company
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STATISTICAL SECTION

TIRES & TUBES
CRUDE RUBBER

AUTOMOBILES
GASOLINE

IT WILL be noted that statistics for May and June covering phases of crude rubber imports, consumption and stocks in the United States, are completed in this section. Tire and tube production, as reported by the Rubber Association, for the month of May, are noted, showing a perceptible decline both in production and shipments and a corresponding increase in inventories.

Crude rubber on hand and afloat on June 30 totaled 136,483 long tons, according to Rubber Association figures raised to 100%. This is only a small decline from May figures, which show a total of 138,744 long tons on hand and afloat. The May total is the largest so far on record. Crude rubber afloat has increased over the past two months, the June tonnage being 47,233 long tons.

Stocks of crude rubber in London decreased in the first week of July by 569 tons, but showed an increase of 246 tons in the second week. Compared, however, to weekly stocks in May and June, it will be noted that a marked decrease has occurred in London stocks since the last week in June. Rubber stocks in Singapore and Penang on June 30 have also decreased, the tonnage being 21,898.

Preliminary reports from the Department of Commerce relative to imports of crude rubber into the U. S. during June show that an estimated tonnage of 29,547 long tons was brought in, this figure representing 100%. The Rubber Association estimates June consumption to be 33,801 long tons, based also on 100%.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available. The section accordingly affords the most up-to-date, complete and convenient statistical service in the industry.

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United States Rubber Imports and Exports
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Rubber Invoiced to the United States
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Stocks of Crude Rubber in the U. S.
Stocks of Crude Rubber in London
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Rims Inspected and Passed in the U. S.
United States Consumption of Gasoline
Rubber Exports from Producing Countries
Rubber Imports into Consuming Countries

U. S. Imports and Exports of Crude Rubber.

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1921	185,394	73,772,677	17.76	5,716	2,414,924	18.86	179,678
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1925:							
Jan.	32,898	22,406,756	30.41	1,162	963,593	37.02	31,736
Feb.	24,696	18,532,115	33.50	979	779,406	35.53	23,717
Mar.	33,072	25,146,691	33.94	1,345	1,105,119	36.69	31,727
Apr.	32,506	24,874,562	34.16	1,130	1,009,305	39.86	31,376
May	36,932	30,311,754	36.64	1,203	1,323,445	49.12	35,729
June	31,569	26,855,883	37.98	1,198	1,577,106	58.75	30,371
July	32,455	33,701,723	46.36	1,278	2,132,681	74.52	31,177
Aug.	33,412	39,834,348	53.22	1,131	1,623,258	64.08	32,281
Sept.	26,367	36,686,013	62.11	1,154	1,820,360	70.41	25,213
Oct.	34,651	50,027,338	64.45	1,132	1,989,291	78.43	33,519
Nov.	37,755	56,271,963	66.54	1,605	2,898,930	80.65	36,150
Dec.	40,329	65,055,868	72.02	1,510	2,625,259	77.61	38,819
	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926:							
Jan.	42,404	72,528,151	76.36	2,084	3,747,505	80.28	40,320
Feb.	32,865	58,733,370	79.78	1,430	2,280,168	71.17	31,435
Mar.	42,152	70,589,581	74.76	1,836	2,735,234	66.51	40,316
Apr.	34,544	48,742,539	62.99	1,128	1,605,093	63.58	33,416
May	29,756	36,896,080	55.35	1,052	1,558,987	66.17	28,704
June	24,900	34,498,561	61.85	1,105	1,371,217	55.41	23,795
July	35,820	33,061,470	41.20	1,554	1,743,854	50.09	34,266
Aug.	27,400	24,670,752	40.21	1,318	1,339,563	45.38	26,082
Sept.	37,112	32,625,032	39.02	1,437	1,519,870	47.20	35,675
Oct.	29,333	25,300,483	38.50	1,366	1,316,270	43.02	27,967
Nov.	38,925	34,661,631	39.97	1,482	1,320,461	42.00	37,443
Dec.	37,754	33,261,366	39.33	1,904	1,841,305	43.16	35,850
	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927:							
Jan.	43,340	36,753,719	37.99	1,526	1,444,734	42.22	41,814
Feb.	28,338	23,110,257	36.41	2,451	2,277,297	41.47	25,887
Mar.	35,514	28,693,026	36.07	2,763	3,249,665	52.50	32,751
Apr.	46,202	37,284,806	36.15	1,575	1,428,425	40.45	44,627
May	36,543	30,998,657	37.87	2,782	2,501,562	41.74	33,761
June	*29,547	23,814,736	37.48				

*Official estimate based on arrivals in New York and Boston.

U. S. Consumption of Crude Rubber

(Rubber Association of America statistics raised to 100 per cent—All figures in long tons)

	Figures on Monthly Basis: 1921	1922	1923	1924	1925	1926	1927
January	5,045	16,938	30,106	29,058	29,638	32,196	31,518
February	5,955	14,767	30,149	25,736	29,761	31,136	30,157
March	9,190	21,408	36,629	28,385	33,498	32,936	36,141
April	13,084	19,294	29,085	27,129	34,139	32,696	35,871
May	16,023	23,246	36,155	25,845	35,322	29,364	34,592
June	16,142	31,713	24,272	22,753	35,822	28,598	33,801
July	18,310	24,522	17,685	23,396	36,053	27,577	
August	23,649	29,361	20,359	28,982	35,909	34,533	
September	16,705	24,410	17,594	31,497	31,691	32,904	
October	16,814	26,881	21,321	31,520	29,047	29,836	
November	14,105	24,950	20,437	27,289	28,853	28,080	
December	15,482	25,070	21,902	27,199	28,748	26,293	
TOTALS	170,504	282,560	305,694	328,769	388,481	366,149	

Quarter	Figures on Quarterly Basis: 1921	1922	1923	1924	1925	1926
Jan./Mar.	65,463	127,360	96,776	87,609	95,263	94,301
Apr./Jun.			89,493	75,674	104,099	87,109
Jul./Sept.	105,962	155,067	55,621	83,813	99,493	93,793
Oct./Dec.			63,617	92,656	85,789	83,212
Total	171,425	282,427	305,507	339,752	384,644	358,415

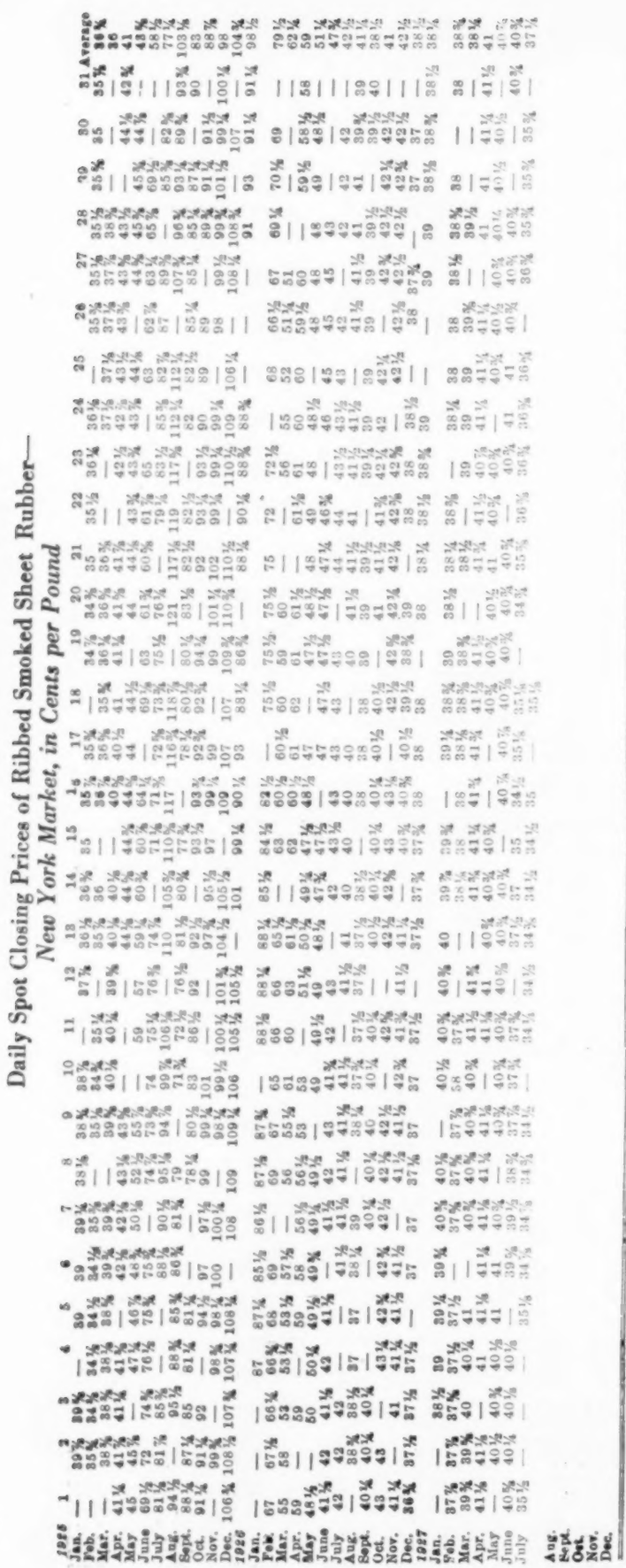
Note: The Rubber Association estimates its monthly rubber consumption figures to be 90% complete. Up until 1925 the quarterly figures were likewise estimated to be 90% complete; beginning with 1925 an estimate of 92% completeness has been used. These estimates have been used in raising the figures in this table to 100%. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Rubber Invoiced to the U. S.

(Reported by American Consuls—Quantities in Long Tons)

During the Week Ended	From Br. Malaya	From Ceylon	From Dutch East Indies	From London & Liverpool	Total
May 7	5,764	431	1,778	464	8,437
May 14	4,749	570	1,054	1,327	7,700
May 21	4,853	505	2,125	897	8,380
May 28	4,687	546	1,540	777	7,550
June 4	6,088	344	2,432	454	9,318
June 11	3,492	486	781	287	5,046
June 18	4,889	173	1,903	505	7,470
June 25	5,256	922	1,331	2,971	10,480
July 2	5,141	646	837	988	7,612
July 9	3,646	371	651	830	5,498

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*



Average Spot Closing Prices--Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Years	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.30	1915	65.85	1919	48.70
1912	121.60	1916	72.50	1920	36.30
1913	82.04	1917	72.23	1921	16.36

Average Monthly Price per Pound since 1922

Months	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents
Jan.	18.82	32.73	25.86	36.71	79.50	38.75
Feb.	16.12	35.14	25.29	36.01	62.25	38.25
Mar.	14.53	34.21	22.83	41.00	59.00	41.04
Apr.	15.99	32.48	22.51	43.64	51.25	40.86
May	15.25	27.39	18.89	58.47	47.75	40.76
June	15.11	26.88	18.81	77.26	42.50	37.25
July	14.67	26.10	22.16	103.16	41.03	
Aug.	13.93	28.84	26.17	82.99	38.50	
Sept.	14.44	28.95	27.56	88.88	41.00	
Oct.	19.78	26.93	31.13	98.01	42.50	
Nov.	23.88	27.14	34.33	104.80	38.50	
Dec.	27.42	26.60	37.88	98.51	38.25	
Average for Year	17.50	29.45	26.20	72.46	48.50	

London Closing Prices of Ribbed Smoked Sheet

(In pence per pound)

Fifth Restriction Year—Third Quarter

Day	May	June	July	Day	May	June	July
1	—	19¾	17	16	19¾	16⅞	16¾
2	19⅞	19½	—	17	19¾	17¼	—
3	19¾	19⅞	—	18	19¾	17	16⅞
4	19¾	—	—	19	19¾	—	
5	19⅞	—	16⅞	20	19¾	16¾	
6	19⅞	—	16⅞	21	19¾	17¼	
7	19⅞	19⅛	16⅞	22	—	17½	
8	—	18⅞	16⅝	23	19¾	17¾	
9	19⅞	18½	16½	24	19⅞	17⅝	
10	19⅞	—	—	25	19⅞	17¾	
11	19¾	18¼	16½	26	19⅞	—	
12	19¾	—	16½	27	19¾	17⅝	
13	19¾	18	16⅝	28	19¾	17⅝	
14	19¾	17⅞	16¾	29	—	17¾	
15	—	17¼	16⅝	30	19¾	17	

(The average price for the period for which daily prices are reported above is approximately 19.392 pence. The British Colonial Secretary has announced that only 60% of the standard production will be exportable from the restricted area during the next quarter if the price during the entire current quarter does not average at least 21 pence.)

Average Price in Previous Quarters

Quarter	1922-23	1923-24	1924-25	1925-26	1926-27
Nov.-Jan.	14.285	14.175	17.9983	46.709	19.265
Feb.-Apr.	16.858	12.917	19.356	28.103	19.696
May-June	14.242	10.974	38.469	21.001	18.739
Aug.-Oct.	14.944	14.632	43.269	20.199	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	June Cents	July Cents	Day of Month	June Cents	July Cents	Day of Month	June Cents	July Cents
1	16.95	17.10	11	17.05	17.65	21	16.85	
2	17.00	17.15	12	——	17.75	22	16.95	
3	18.85	——	13	16.60	17.70	23	16.85	
4	16.75	——	14	16.80	17.75	24	16.80	
5	——	17.15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
6	16.35	17.15	16	16.90	18.30	26	——	
7	16.40	17.10	17	16.95	——	27	16.75	
8	16.60	17.15	18	16.90	18.05	28	17.05	
9	17.10	17.35	19	——		29	16.95	
10	17.05	——	20	17.05		30	17.05	
						31	——	

Average Monthly Price Per Pound

Month	1925 Cents	1926 Cents	1927 Cents	Month	1925 Cents	1926 Cents	1927 Cents
Jan.	23.99	20.85	13.42	Aug.	23.72	18.57	
Feb.	24.70	20.60	14.10	Sept.	23.79	17.02	
Mar.	25.64	19.35	14.32	Oct.	21.77	13.14	
Apr.	24.54	19.13	14.75	Nov.	20.94	12.86	
May	23.41	18.92	16.07	Dec.	20.06	12.68	
June	24.13	18.57	16.85	Average for Year	23.45	17.53	
July	24.68	18.71					

Stock of Crude Rubber in the U. S.

(All Quantities in Long Tons)

At	ON HAND			AFLOAT			AND AFLOAT ON HAND		
End of	1925	1926	1927	1925	1926	1927	1925	1926	1927
Jan.	60,870	55,198	76,172	36,759	46,296	45,312	97,629	100,434	121,484
Feb.	54,109	58,035	91,186	41,475	46,935	42,166	95,584	104,970	133,352
Mar.	52,494	61,822	85,740	40,577	43,567	49,600	93,071	105,389	135,340
Apr.	50,143	55,261	92,757	53,465	41,905	38,963	103,608	97,166	131,720
May	52,064	64,360	94,563	46,846	40,303	44,181	98,910	104,663	138,744
June	50,997	60,463	89,253	51,202	40,997	47,233	102,199	101,367	136,483
July	46,245	64,900		46,003	38,062		92,248	102,962	
Aug.	42,354	60,870		41,254	37,360		83,608	98,230	
Sept.	36,367	62,078		55,151	42,464		91,518	105,542	
Oct.	34,085	64,989		51,098	52,930		85,183	117,919	
Nov.	34,885	69,385		42,692	47,311		86,577	116,696	
Dec.	51,215	72,520		48,208	52,020		99,423	124,540	

(Rubber Association of America figures raised to 100%.)

Stock of Crude Rubber in London

(No. of tons in Wharves and Warehouses, including Latex)

At End of:	1920	1921	1922	1923	1924	1925	1926
January	19,300	56,573	67,232	73,498	57,460	27,172	9,994
February	18,329	59,439	67,623	70,483	56,732	23,425	10,004
March	18,969	63,913	66,670	63,438	55,647	18,104	13,750
April	20,072	68,759	68,637	58,770	54,559	12,949	18,951
May	20,921	70,403	70,146	54,439	51,615	5,895	20,896
June	22,517	69,408	71,597	51,050	51,115	5,318	23,894
July	25,346	71,065	71,515	49,937	52,073	4,258	27,727
August	30,674	73,211	72,112	48,427	49,700	4,619	30,764
September	35,504	72,175	70,977	54,523	44,011	5,453	35,077
October	41,743	69,229	68,536	58,891	37,523	5,086	42,141
November	45,550	70,786	68,548	60,074	33,593	3,869	44,057
December	50,652	69,792	72,299	60,246	29,488	5,697	48,921

At End of Recent Weeks

1926	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
November	43,045	43,299	44,553	43,859	—
December	44,395	46,349	47,324	48,382	—
1927					
January	48,948	50,756	52,484	53,662	54,786
February	55,740	56,939	56,962	58,659	—
March	59,945	61,516	61,300	63,167	—
April	62,634	63,861	65,033	65,511	67,034
May	68,187	68,041	66,668	67,054	—
June	67,105	67,454	66,894	64,486	—
July	63,917	64,163	63,511		

Rubber in Singapore and Penang

(Stocks held by Dealers—Quantities in Long Tons)

End of	1925	1926	1927	End of	1925	1926	1927
Jan.	15,925	15,726	25,440	July	15,894	23,101	
Feb.	17,320	13,653	26,766	Aug.	17,251	23,362	
Mar.	17,261	18,389	27,844	Sept.	16,526	25,997	
Apr.	15,368	16,328	24,543	Oct.	15,346	26,614	
May	15,804	16,967	25,133	Nov.	19,788	25,486	
June	15,884	19,416	21,898	Dec.	18,840	26,443	

Rims Inspected and Passed in U. S.

(Tire & Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1923	23,140,620	0.6	1925	26,001,664	66.8
1924	21,863,311	19.7	1926	24,199,524	78.8
1926			1927		
July	2,123,368	84.8	January	1,489,078	77.0
August	2,378,850	82.3	February	1,753,224	84.4
September	2,365,518	80.7	March	2,071,989	85.1
October	1,828,539	76.9	April	2,060,868	88.0
November	1,210,472	77.0	May	2,169,208	86.9
December	1,096,429	76.7	June	1,871,538	77.0

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1924	1925	1926	1927
January	11,918,000	14,386,000	17,582,000	17,888,000
February	9,626,000	13,210,000	15,814,000	18,240,000
March	10,961,000	14,890,000	19,302,000	22,464,000
April	14,583,000	19,013,000	20,848,000	23,371,000
May	15,889,000	20,459,000	24,213,000	26,579,000
June	16,421,000	20,724,000	23,803,000	
July	18,610,000	22,879,000	24,752,000	
August	19,825,000	22,323,000	26,912,000	
September	16,871,000	20,177,000	22,929,000	
October	18,029,000	19,826,000	23,973,000	
November	16,607,000	18,024,000	20,618,000	
December	15,663,000	17,954,000	21,419,000	
TOTAL	185,003,000	223,865,000	262,165,000	

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1922	1923	1924	1925	1926
Production	40,932	45,259	51,633	60,845	61,237
Shipments	39,987	45,204	50,120	59,262	59,002
Inventory[2]	6,132	5,772	7,427	8,142	10,456

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1925	1926	1927	1925	1926	1927	1925	1926	1927
Jan.	4,740	4,587	4,965	4,013	2,974	4,932	7,949	9,947	10,432
Feb.	4,908	4,865	5,095	3,924	3,436	4,458	8,928	11,164	11,075
Mar.	5,276	5,456	6,276	4,657	4,561	5,701	9,510	12,004	11,583
Apr.	5,341	5,346	6,299	5,498	4,980	5,701	9,088	12,461	12,122
May	5,467	5,023	6,151	5,954	5,211	5,657	8,611	12,343	12,462
June	5,418	5,422		6,737	5,724		7,243	11,968	
July	5,587	4,950		6,298	6,337		6,421	10,592	
Aug.	5,607	5,872		4,760	6,744		7,261	9,732	
Sept.	5,007	5,706		4,569	6,040		7,681	9,318	
Oct.	4,505	5,103		5,580	4,544		6,670	9,917	
Nov.	4,229	4,324		3,671	3,733		6,955	10,297	
Dec.	4,760	4,683		3,601	4,718		8,142	10,456	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1922	1923	1924	1925	1926
Production	50,850	60,116	70,706	82,614	76,618
Shipments	49,673	59,072	68,016	81,004	71,591
Inventory[2]	7,643	8,425	11,052	11,313	16,230

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1925	1926	1927	1925	1926	1927	1925	1926	1927
Jan.	6,343	6,809	5,337	5,576	3,723	6,016	11,570	14,361	15,585
Feb.	6,339	6,825	5,658	4,971	3,736	5,120	13,023	17,090	16,075
Mar.	7,000	7,030	7,184	5,711	4,987	6,157	14,236	19,131	17,096
Apr.	6,851	6,554	7,373	6,704	5,051	6,359	13,618	20,674	17,801
May	6,846	6,149	6,737	8,040	6,304	6,140	12,501	21,141	18,389
June	6,942	6,171		9,032	6,898		10,409	20,243	
July	7,544	5,729		9,140	8,569		8,635	17,267	
Aug.	7,618	7,424		6,923	9,579		9,271	15,462	
Sept.	7,254	7,590		6,665	7,762		9,950	15,312	
Oct.	6,612	6,208		7,845	5,474		8,726	15,929	
Nov.	6,266	4,852		5,406	4,045		9,491	16,604	
Dec.	6,999	5,277		4,991	5,463		11,313	16,200	

(1) Rubber Association of America figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	Passenger Cars			Trucks		
	Total	United States	Canada	Total	United States	Canada
1920	1,883,158	1,799,522	83,636	322,039	311,531	10,508
1921	1,514,000	1,452,902	61,098	147,550	142,402	5,148
1922	2,397,827	2,302,923	94,904	251,434	244,285	7,149
1923	3,719,164	3,589,936	129,228	378,288	361,078	17,210
1924	3,262,764	3,144,999	117,765	378,106	360,625	17,481
1925	3,817,639	3,678,328	139,311	498,019	475,941	22,078
1926						
January	284,703	272,922	11,781	33,461	29,763	3,698
February	334,524	319,763	14,761	41,685	37,608	4,077
March	399,105	381,116	17,989	49,233	44,848	4,385
April	401,836	383,907	17,929	53,887	50,314	3,573
May	394,569	373,140	21,429	51,343	47,838	3,505
June	358,360	339,542	18,818	47,043	44,110	2,933
July	328,816	315,863	12,953	41,847	39,592	2,255
August	393,040	380,258	12,782	47,907	45,404	2,503
September	363,537	350,913	12,624	51,299	46,428	4,871
October	300,142	289,547	10,595	46,965	42,890	4,075
November	226,278	219,504	6,774	39,410	36,356	3,054
December	143,413	137,361	6,052	30,002	28,302	1,700
TOTAL	3,928,323	3,766,336	161,487	534,082	493,453	40,629
1927						
January	208,718	196,973	11,745	40,874	37,243	3,631
February	275,458	260,632	14,826	41,947	38,118	3,829
March	360,754	341,665	19,089	48,590	45,056	3,534
April	373,961	353,071	20,890	48,216	44,495	3,721
May	374,259	352,268	21,991	47,890	44,173	3,717
June						
July						
August						
September						
October						
November						
December						

Exports of Crude Rubber from Principal Producing Countries

(Figures in Long Tons)

	BRITISH MALAYA[1]							DUTCH EAST INDIES[3]						
	Gross Exports	Gross Exports minus Imports	Imports	India & Burma[2]	Sarawak[4]	British North Borneo[3]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Fr. Indo-China[3]	Amazon Valley[5]	All Other[3]	World Total[1]
1923	252,016	70,432	181,584	37,112	6,416	5,705	4,237	1,718	32,938	48,402	43,422	5,606	19,127	7,856	404,123
1924	259,706	108,524	151,182	37,351	7,697	6,699	4,621	2,962	42,446	53,483	80,347	6,688	22,906	9,065	425,447
1925	316,825	158,022	158,803	45,684	10,082	8.413	5,424	5,394	46,643	62,678	119,271	7,881	24,079	13,797	508,149
1926:															
Jan.	30,452	10,237	20,215	4,058	1,273	416	472	289	4,397	6,277	8,081	915	1,697	1,805	49,895
Feb.	30,440	8,306	22,134	4,941	725	488	450	253	4,474	5,734	6,801	554	2,169	1,978	50,701
Mar.	35,012	14,800	20,212	5,708	1,113	792	561	418	4,865	5,612	11,880	573	2,395	1,899	56,028
Apr.	23,727	10,565	13,162	3,484	590	679	374	293	4,522	4,598	6,208	410	1,778	1,529	37,627
May	31,231	10,604	20,627	3,600	691	927	410	279	4,742	5,293	8,606	502	2,144	1,464	49,285
June	30,624	11,764	18,860	2,906	452	779	512	275	5,440	6,111	9,844	549	1,367	1,279	49,374
July	28,824	15,280	13,544	4,800	938	911	420*	439	4,929	5,522	12,864	1,521	1,246	1,148	48,282*
Aug.	34,625	13,595	21,030	5,246	521	890	420*	316	4,418	3,472	10,349	378	1,411	1,097	49,548*
Sept.	35,913	13,972	21,941	6,027	652	888	420*	457	4,326	6,757	10,971	681	1,463	822	55,405*
Oct.	39.367	15,203	24,164	6,026	635	805	420*	385	4,193	6,988	11,513	661	1,616	1,023	58,429*
Nov.	34,302	12,201	22,101	4,687	1,111	685	420*	285	4,060	5,746	8,998	718	1,780	1,259	51,850*
Dec.	36,811	14,716	22,095	6,361	1,177	895	420*	338	5,025	7,106	12,333	790	2,492	714	59,746*
	391,328	151,243	240,085	58,844	9,878	9,155	5,299*	4,027	55,391	69,216	118,448	8,252	21,558	16,017	616,170*
1927:															
Jan.	34,946	14,995	19,951	6,697	921	959	500*	304	4,184	6,705	10,541	941	2,885	981	55,780*
Feb.	27,528	11,607	15,921	3,571	1,469	552	500*	360	4,707	6,526	10,634	675	2,082	1,098	48,113*
Mar.	41,346	17,464	23,882	7,141	1,124	997	500*	432	5,657	7,003	12,490	733	3,203	1 791	63,454*
Apr.	29,041	13,069	15,972	3,349	723	984	500*	526	4,666	5,530	10,035	557	2,374		
May	31,393	15,491	15,902	3,124	760	786	500*	348	5,430	5,528	14,099	586	2,431		
June															
July															
Aug.															
Sept															
Oct.															
Nov.															
Dec.															

(1) Malayan net exports cannot be taken as production since imported rubber is largely wet native rubber which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, and 3,263 in 1926. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, and about 20 tons in 1926. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, and about 60 tons in 1926. In 1926, 196 tons of latex sprayed rubber and 125 tons of ficus rubber were exported from Java and Madura. (6) Calculated from official import statistics of principal consuming countries; viz., United States, United Kingdom, France, Germany, Italy, Belgium, and Netherlands. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States	United Kingdom	France (abd)	Germany	Canada (ac)	Japan (ac)	Italy	Russia (ce)	Australia (cf)	Belgium (d)	Netherlands	Sweden (abcd)	Norway (abc)	Denmark (abd)
1919	236,977	42,671	19,951	5,584	8,770	10,688	9,894	75	733	3,995	2,771	2,022	437	673
1920	248,762	56,844	15,868	11,890	11,912	6,015	6,123	62	1,040	3,840	5,510	1,567	241	479
1921	179,678	42,087	16,981	21,920	8,248	22,981	3,906	165	554	1,705	1,022	813	178	251
1922	296,267	11,724	27,644	27,546	9,366	16,449	6,430	2,453	2,649	172	-3,807	1,248	321	87
1923	300,372	12,700	31,067	18,519	13,299	17,181	8,489	4,506	1,631	2,184	792	1,391	448	354
1924	317,747	-11,550	34,488	22,727	14,420	19,612	8,764	824	3,127	2,688	-807	1,781	669	473
1925	381,815	4,061	36,911	33,937	19,825	12,743	11,412	7,088	4,217	2,930	875	1,690	701	440
1926	395,667	84,865	39,390	22,775	20,253	18,125	9,809	6,529	7,860	2,498	2,665	2,125	609	575
1926:														
January	40,345	6,886	3,170	703	2,188	892	760	332	358	76	154	123	46	51
February	31,435	3,114	3,513	1,113	1,881	741	1,041	643	432	143	89	171	82	94
March	40,316	8,907	4,790	1,342	2,079	864	1,037	832	469	129	227	213	81	55
Apr.	33,416	8,275	4,834	1,781	1,624	1,868	865	402	431	71	93	204	27	23
May	28,705	6,773	2,937	1,848	1,239	1,010	705	200	386	186	241	110	24	47
June	23,795	5,894	2,327	1,655	1,188	1,465	1,070	983	546	269	214	178	20	34
July	34,266	6,768	2,603	2,202	1,552	1,447	800	132	586	295	480	195	34	27
Aug.	26,081	7,327	2,819	2,110	1,388	1,284	796	655	1,159	303	596	199	52	55
Sept.	35,675	8,843	2,900	2,029	1,355	1,922	819	472	1,125	283	430	159	43	27
Oct.	28,110	8,082	2,962	2,423	1,865	2,396	645	585	889	301	2	210	63	43
Nov.	27,673	9,247	3,194	3,007	1,548	3,380	832	568	802	194	-18	179	65	50
Dec.	25,850	4,749	3,341	2,562	1,846	856	439	725	677	248	157	184	122	69
1927:														
January	41,815	10,192	3 732	2,481	1,936	1,227	672	803	929	296	181	164	53	52
February	25,886	7,692	3,708	3,103	2,620	1,902	601	907	460	502	153	191	53	27
March	32,752	9,049	2,328	3,475	3,760	1,578	852	784	780	454	86	219	46	76
April	44,627	7,875	2,693	2,393	1,509	2,181	781	1,972	762	448	58	136	50	27
May	33,761	2,896		3,380	2,073	1,084		887	694		-57			
June														
July														
Aug														
Sept.														
Oct.														
Nov.														
Dec.														

a—Including gutta percha. b—Including balata. c—Reexports not deducted. d—Believed to include scrap and reclaimed rubber. e—Russian statistics are exports from United Kingdom only to Russia. f—Australian annual statistics including 1924 are exports to Australia from Malaya, Ceylon, Dutch East Indies and United Kingdom; monthly figures and total for 1925 are exports from Malaya, Ceylon, and Java only. -Minus sign, reexports in excess of imports. *All statistics from original official trade returns.*

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